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*Illustrated.

The conference on the valuation of railways, called by Director of Valuation Prouty, and held at Washington last week, was the most important meeting to consider this subject ever held. It was so important because of the leading character of the questions specifically discussed, because of the large and able representation of the railways and of the states present, and because of the magnitude of the general undertaking to which the conference related. The ultimate success of the valuation work will depend largely on the degree of co-operation obtained between the Interstate Commerce Commission, the railways, the state governments and commercial and banking interests, the latter of which may later awaken to a realization of the extent to which they may be

affected. The participation of the railways in the conference was notable not only by reason of the large and able representation of the legal, engineering and accounting departments, but also by reason of the careful preparation of their case, which was evinced, and by the harmony of view manifested in presenting it. It is well known that there are differences of opinion between individual railway men on the subject of valuation, but the railway managers have recognized the expediency of harmonizing their differences and presenting a united front on all the larger issues. The ideal way to carry on the valuation would be to get all the parties concerned to agree on the fundamental principles involved and on the methods that should be used. This is doubtless impracticable, but the course adopted by Director Prouty of bringing representatives together for thorough but somewhat informal conferences of this kind, will tend to reduce the number of points of difference, to simplify and expedite the work and to keep down the expense of doing it.

Legislation to limit the length of freight trains is being advocated by the labor brotherhoods as a means of reducing railway

Accidents to Long and Short Trains

accidents. It has been pointed out in reply to this that a reduction in the length of trains would cause an increase in the number of them run, and that the statistics of the Interstate Commerce Commission show that almost invariably an increase in the number of trains run results in increase of accidents, and a decrease in the number of trains run results in a decrease of accidents. This answer to the argument for train limit legislation seems strong enough, but it is interesting to find that statistics show further that on the whole there are more accidents to short freight trains than to long ones. The Illinois railways have compiled statistics which demonstrate that on 23 of the principal steam railroads in that state which operate trains of 50 cars or over, the chance of death or injury to railroad employees was 37 per cent greater in 1913 on trains of 50 cars or less, than on longer trains. These 23 roads in that year operated in Illinois 236,702 trains of over 50 cars, on which 23 employees were killed or injured for every 3,430 trains run. The same roads ran 413,510 trains of 50 cars or less, on which 43 employees were killed and 149 seriously injured, or one to every 2,154 trains run. On the longer trains one man was killed for every 10,291 trains run and one was injured for every 5,145; whereas on the shorter trains one was killed for every 9,616 trains and one injured for every 2,775. Probably the main reason for the greater proportionate number of accidents in connection with the operation of short trains is due to the fact that they ordinarily are run faster. The Kansas railways also have found that there are more accidents to short than to long trains in that state.

Governor Walsh of Massachusetts has vetoed the two bills which had been passed by the Massachusetts legislature after conferences with the state public service commission, which it was believed would have made possible a readjustment of the New Haven's financial affairs and the validation of certain of its securities, at least insofar as Massachusetts is concerned. Some of the comments of Governor Walsh accompanying the veto are published in the financial columns of this issue. The gist of the governor's objections seemed to be that the bill would legalize something which had hitherto been illegal and make it possible for the New Haven at some future date to get out of the clutches of Massachusetts. Regardless of the merits of the charge which the governor makes that the legislature changed in certain very essential ways the two bills at the last moment and without the approval of the railway commission, the whole situation is deplorable. It illustrates in a striking way the evils of state regulation of railroads. Openly and shamelessly the three states principally concerned in the Boston & Maine tangle have

The New Haven Bill Vetoed

squabbled over local questions. New Hampshire had already passed adversely on a bill similar to the Massachusetts Boston & Maine bill because its interests were not sufficiently "taken care of." On the other hand, both Connecticut and Rhode Island, which are concerned in the New Haven financial readjustment, have approved bills which would grant the relief aimed at by the Massachusetts-New Haven bill. The Boston Transcript, after the New Haven and Boston & Maine bills had been passed by the two houses of the Massachusetts legislature, and before the governor had acted on them, said:

With all too little assistance from the governor, who has appeared both confused and vacillating with regard to the whole railroad situation, the legislature has solved its railroad problems in conference and in co-operation with the public service commission. . . . President Elliott of the New Haven and President Hustis and the trustees of the Boston & Maine were freely consulted and showed at all times a realization of their responsibilities to the public as well as to their respective parties.

As has been pointed out before in these columns, the Massachusetts law which did not permit the sale of stock except at the market quotations by making financing through stock issues wholly unattractive, has been as potent as any other one factor in bringing about the present Boston & Maine situation. Now when the whole New England railroad situation is in a most critical state, sectional jealousies, local and selfish interests, and political prejudice are allowed to have a predominating part in the state regulation of the New England railroads.

DEPRECIATION AND RAILROAD CREDIT

THERE is published elsewhere in this issue an article by Morrell W. Gaines, characterizing the commission's rules for charging for depreciation and retirements of equipment as a threatened "billion dollar confiscation." The article brings out in a very interesting way one side of this question of a charge to operating expenses for depreciation concurrently with a charge to operating expenses and to profit and loss for the original cost of the equipment retired. The point is made that this new requirement of the commission, which permits only so much of the original cost of a unit of equipment to be charged against accrued depreciation as has been accrued on that particular unit, and requires that the remainder, less scrap value, be charged in part to expenses and in part to profit and loss, while at the same time a charge must be made to expenses for depreciation of equipment, puts a double burden on the present generation of railroad securityholders that is entirely unwarranted. This fact can hardly be disputed. The commission may argue that if all railroad companies had on July 1, 1907, accepted the theory of depreciation, and thereafter made an adequate charge to expenses for depreciation, there would be now no undue burdening of the expense accounts through charges for retirements, and that the charge to profit and loss was sound accounting, tending in the long run to make the books show accurately the cost of assets and the earning power of the property. The fact remains, however, that the commission's theories of depreciation were a matter on which there could be an honest difference of opinion and that the majority of the roads did not accept these theories on July 1, 1907.

The credit of a railroad company is one of its assets, and if it were a fact that through arbitrary rules enforced by the Interstate Commerce Commission the credit of railroads were seriously detracted from, it would be entirely proper to call this confiscation. On the other hand, if the commission's rules call for a degree of publicity and a form of statement of what is, however stated, an actual fact, it is hardly fair or accurate to call this confiscation, even if it temporarily hurts the credit of some railroads.

The position of each individual railroad is a separate case which presents individual problems. The Interstate Commerce Commission has not as yet fixed a rate of depreciation which is mandatory. It is to be hoped that at least for a number of years the commission will not fix such a rate. The fixing of a rate

for depreciation and the charging of depreciation is the distribution of a business risk, but it is also guessing. If the management of a railroad property, familiar with the physical condition of its equipment and its policy in regard to repairs and renewals, guesses at what the rate of depreciation—in practice generally a rate of obsolescence rather than depreciation—will be, the guess may be somewhere near the mark. If the Interstate Commerce Commission were to make a guess for the whole country and then make this guess mandatory, it would in a great number of instances be dangerously wide of the mark and might also work very real and serious harm to some railroad companies.

The situation appears to be this: The commission's theories about depreciation and charges for retirements are in general sound. Any number of individual instances may be cited where the facts would fail entirely to conform to the theory; but this does not vitiate the general soundness of the rules for charging depreciation. If rates are to be fixed with regard to the value of the property, and if the commission is inclined to permit such rates as will yield a fair return on the value of the property, the sooner an accurate method of stating cost of property and an estimate of its yearly depreciation is adopted the better. Co-operation between individual railroad companies and the Interstate Commerce Commission should, if the commission takes a broad point of view and the railroad managements a helpful attitude, minimize the hardship that will be worked on present securityholders. If this attitude of co-operation is adopted and the commission does not arbitrarily fix a rate of depreciation, but continues to make a study of the subject with the aid of the railroad managements, it would seem that the situation ought to work out to the ultimate good of the railroads.

TURN BACK THE CLOCK!

THERE are some people who think that the development of modern transportation has contributed more than anything else to the promotion of the economic welfare of the public. There are others who think that the development of modern transportation has been a crime against the public welfare and ought to be stopped.

The latter class are advocating the passage in Illinois and other states of a law to limit the length of railway freight trains. They could not advocate any measure which would more effectively and completely destroy the principal economies that already have been introduced in railway transportation and prevent the introduction of any more. From the time such a law went into effect all substantial reductions in the cost of railway operation would cease, and, if increases in wages continued, enormous and unprecedented advances in the cost of transportation would begin. For the handling of traffic in larger and larger units has been the most characteristic feature of modern transportation on both water and land; it has been the only thing which has enabled the railway companies to stand the heavy increases in wages and other expenses in recent years without proportionate increases in rates; and if the increase in the size of transportation units is to be stopped there can be no further substantial increases in wages and improvement in working conditions without proportionate increases in transportation costs and transportation rates. The attitude of those advocating this legislation is, "Turn back the clock. Transportation progress must stop. Human welfare demands it. The increase in the size of freight trains saves labor and thereby prevents as many men being employed as otherwise would be employed."

But let us be consistent. If we are to stop progress in railway transportation in the purported interest of labor, let us stop it in all other lines of transportation.

Goods are now being hauled on the highways in five-ton motor trucks. This is all wrong. It causes unemployment of horses and men. A law ought to be passed to prohibit the use of motor trucks. More horses and men would be required to handle the

traffic in four-horse wagons. Better still, let us go back to two-horse wagons. Or, better yet, let us go back to the two-wheel cart drawn by one ox. That was ideal highway transportation. On the precious theory of the "50-car bill" advocates transportation on highways exclusively in one-ox two-wheel carts gave the maximum amount of remunerative employment to labor.

Turn back the clock! In the name of human welfare, restore to us our ox-cart transportation!

So with water transportation. The tendency on the great lakes and the oceans is to handle traffic in larger and larger steamships. The purpose of this is to save labor and other expenses. This is all wrong. A law should be passed to limit and reduce the size of steamships. Better still, let us prohibit steamships entirely. It requires more human labor to carry a given amount of freight in sailing vessels than in steamships. But the ideal toward which we should work is a return to the exclusive use of those ancient vessels known as galleys, which were propelled by slaves chained to the oars. They afforded the maximum employment to human labor in proportion to the amount of traffic handled.

Turn back the clock!

And while we are legislating regarding the length of freight trains, why make their maximum 50 cars? Why not make it 25 cars? That would be twice as beneficent. Why not make it 12 cars? Or, why not provide that a train shall consist of an engine, one freight car and a caboose? Think of the men who would be given employment then!

Why has not one of the innumerable inspired jackasses who busy themselves in framing labor legislation rendered himself immortal by drafting a law to require all water transportation to be conducted in flat-bottomed skiffs and all land transportation to be conducted in wheel-barrows?

RAILROADS IN THE HANDS OF RECEIVERS

THE total mileage of railroads of the United States in the hands of receivers is at present almost exactly the same as the total on June 30, 1896, which was the highest ever recorded in the history of the country. Of course the proportion of mileage in the hands of receivers to total mileage operated is much less than it was in 1896, because of the very much larger mileage now operated.

The comparison is rather startling, however, because on June 30, 1896, the railroad situation was distinctly on the mend. Most of the larger roads then in the hands of receivers were practically already out of the woods. On the other hand, at present not a single one of the important large systems being operated by receivers is out of the woods. It is true that the Wabash has announced a reorganization plan, and although it is drastic and has been underwritten, the company will have to show materially better earnings than it did last year to insure the eventual success of the plan.

At present there is approximately 30,500 miles of railroad in the hands of receivers. The total mileage in the hands of receivers on June 30, 1896, was 30,475. The total par value of securities outstanding of roads being operated by receivers in 1896 was \$1,795,900,000. The par value of securities outstanding for the roads now being operated by receivers is approximately \$1,815,900,000. The fact that the capitalization of the roads now in the hands of receivers compares so favorably with the capitalization of the roads being operated by receivers in 1896 is apparently a coincidence, although, of course, it might be possible to point out some general truths which this fact probably illustrates. The Philadelphia & Reading, which was in the hands of receivers in 1896, had outstanding securities per mile much in excess of the road's power to earn a return on them. The same is true with the Wabash at present. The larger systems which are now in the hands of receivers are the Chicago, Rock Island & Pacific, with 8,328 miles of road; the St. Louis & San Francisco, with 4,747 miles of road; the Wabash, with 2,514

miles of road; the Pere Marquette, with 2,322 miles of road; the Chicago & Eastern Illinois, with 1,282 miles of road; the International & Great Northern, with 1,106 miles of road, and the Cincinnati, Hamilton & Dayton, with 1,015 miles of road. The principal roads that were in the hands of receivers in 1896 were the Northern Pacific, with 4,533 miles of road; the Union Pacific, with 1,836 miles of road, and its subsidiaries having an additional mileage of approximately 5,900 miles; subsidiaries of the Atchison, Topeka, & Santa Fe, with approximately 2,000 miles; the Baltimore & Ohio, with 2,073 miles; the Norfolk & Western, with 1,571 miles, and the Philadelphia & Reading, with 884 miles.

A study of the table which the *Railway Age Gazette* publishes in its annual review number, giving a record of roads thrown into receiverships since 1876, apparently indicates a very different situation at present than in 1896. The large mileage of roads that were still in the hands of receivers on June 30, 1896, was accounted for principally by the receiverships established in 1892 and 1893, in which two years there was a total of 39,848 miles of road which became insolvent. In 1896 itself only 5,441 miles of road was put into the hands of receivers, and in the previous year but 4,089 miles of road. On the other hand, the present large mileage is accounted for by roads that have gone into receiverships comparatively recently. The Rock Island receivership dates back but a few weeks. The mileage of roads that became bankrupt in 1914 was 4,222; in 1913, however, 9,020. With the exception of 1908, in which year the Seaboard Air Line and the International & Great Northern were turned over to receivers, there was no year in which as much as 4,000 miles of road became insolvent back to 1896. The Seaboard Air Line has been taken out of the hands of receivers since 1908, and the International & Great Northern was taken out, but had to again seek the protection of the courts at the outbreak of the European war.

The ten years following 1896 were years of unparalleled prosperity in the United States. They were, moreover, years in which a very large investment was made in American railroad securities by European investors. By June 30, 1896, the return of prosperity, at least insofar as the bankrupt railroads were concerned, was well in sight. The Atchison, Topeka & Santa Fe had been taken out of receivership in December, 1895, and this might be called the real turning point in the railroad situation. The Northern Pacific was taken out before the end of 1896, as were also the Union Pacific and the Norfolk & Western. The Baltimore & Ohio was reorganized without foreclosure sale in 1899. In 1896 no one of the large roads in the hands of receivers was in what might be called at all a hopeless situation. At present the Pere Marquette, the Western Pacific and the Atlanta, Birmingham & Atlantic have little, if any, immediate prospect of reorganization, and the St. Louis & San Francisco and the Cincinnati, Hamilton & Dayton quite probably cannot be reorganized at least until after the end of the European war. The Chicago, Rock Island & Pacific may have only a very short receivership. The conflicting interests connected with the property apparently hold such divergent views at present that any opinion that might be ventured as to when the property would be reorganized would be the purest guesswork.

One more black touch to the picture and we are done with it. There are two or three large systems which have just scraped off the rocks of receivership through a temporary extension of obligations falling due, and whether or not their mileage shall be added to the 30,500 miles of road now under the protection in the courts will depend largely on the business situation in the next six to nine months.

Of course the railroad situation taken as a whole is by no means as gloomy as one might suppose from looking only at the facts presented above in regard to receiverships. On the other hand, it is only right that railroad men as well as the Interstate Commerce Commission should face squarely the unpleasant facts as well as the hopeful features of the situation.

Letters to the Editor

THE UNIVERSAL HOME ROUTE CARD

CHICAGO, ILL.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The intelligent use of the universal home route card will pay a big return on the investment—so big, in fact, that if the attention of the chief operating officers can be secured long enough to make the matter clear, they will do the rest. Unfortunately, opposition is developing in unexpected places and differences have already arisen regarding points which must be uniformly understood if the plan is to accomplish its reasonable measure of usefulness.

It is the object of this letter to help to bring about this common understanding.

Our present plan of handling surplus foreign equipment involves a vast amount of telegraphing, much work in divisional and card record offices, switching to and from hold tracks, much unnecessary mileage, unknown amounts exchanged as per diem and more hazard of accident from defective equipment than is generally recognized.

The objective of the universal home route card is to have with the car at all times a complete junction record for use in effecting prompt and economical home routing.

The requisites are a supply of cards, stamps and ink-pads, plus the conscientious stamping of the cards for foreign cars received in interchange and the careful handling of all cards as per instructions. The returns to be secured are:

1. A great reduction in empty car mileage, with a corresponding saving in train miles.
2. Abolition of most of the disposition telegraphing.
3. Elimination of interference with the work of record clerks.
4. A substantial saving in switching.
5. Reduced wear and tear of equipment as per items one and four with proportionate reduction in repair expense.
6. Earlier return of surplus equipment to owners and in better order, making possible earlier restoration to serviceable condition.

That these are not visionary claims will be evident upon analysis. For example, does any one familiar with the matter doubt that if the elimination of that part of the cost of repairing freight cars properly chargeable to empty car movements which can be avoided by the intelligent use of the universal home route card were all there is to gain, it would still be one of the best opportunities yet offered for reducing operating expenses?

It is undoubtedly true that there are many difficulties to be overcome in the practical operation of the plan, but as some of our largest and most important lines are already operating successfully under system cards it is reasonable to conclude that the difficulties are not insurmountable, and surely even a low percentage of the theoretical efficiency would warrant the trouble and expense involved.

In the article on this subject which appears on page 884 of the *Railway Age Gazette* of April 23 occurs the following: "The proposed rule will require that the short route be used where it can be done without creating empty mileage in excess of the original loaded haul."

This statement, based on A. R. A. Circular 1525, I regret to say, is correct.

It may be, and probably is, true that at the present time it is impossible to go further, but it is also true that the entire plan rests on the principle of reciprocity and that much of its possible benefit will be lost unless each road's policy is broad and statesmanlike, including the making of additional empty mileage

on its own rails with any car on which a substantial net saving can be made on other lines.

E. H. DeGROOT, JR.,

Superintendent of Transportation, Chicago & Eastern Illinois.

RIPLEY ON RAILROADS: FINANCE AND ORGANIZATION

LONDON, ENG.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In common, I doubt not, with every other student of railroad affairs, I have read Professor Ripley's new book, "Railroads: Finance and Organization,"* with the utmost interest. To praise it is, I feel, almost an impertinence. We are accustomed by now to Professor Ripley's wide knowledge of facts, his capacity of mastering them and his keen-sighted criticism. We take it for granted that these qualities will be displayed in whatever proceeds from his pen. And in this case we are not disappointed.

And yet for my own part I am constrained to wonder whether there is not a good deal of truth in the old proverb that "lookers on often see most of the game." Certainly I cannot myself draw from the facts that Professor Ripley records the conclusion that he does. He, as I understand him, concludes that because there have been failures, mistakes, scandals and frauds in the history of American railways, therefore public authority must interfere with strict and detailed regulations to prevent the possibility of such occurrences in the future. My answer, on the other hand, if I were asked to advise the public authority, would be in the famous words of Lord Melbourne, "Can't you leave it alone?"

If I have a fault to find with Professor Ripley as a historian, it is that he tells us too much about the one sinner and forgets to mention the ninety and nine just persons who need no repentance. We hear much of Jim Fisk and Jay Gould, of the Alton, 'Frisco and New Haven scandals, but not one word of the constructive work of men like Roberts and Cassatt, of the Pennsylvania; of Charles P. Clark, of the New Haven; of Samuel Spencer and William Finlay, of the Southern. Even James J. Hill appears, not as the one man more responsible than any other for the building up of the Northwest, but either as the hero of the Northern Securities fight, or else as the fairy godmother of his fortunate shareholders. With Professor Ripley's summing up of his own conclusions no railway man, jealous of the honor of his profession, could reasonably quarrel. Speaking of construction methods, after a whole chapter of what he himself describes as "rather depressing comment," he writes as follows:

The magnitude of the achievement, as a whole, must constantly be kept in mind. To have opened up a continent to settlement within the short space of seventy years is an accomplishment unparalleled in history. The creation of the greatest railway net in the world, practically within two generations, in spite of all the obstacles opposed by nature and the limitation of capital resources, should be a matter of national pride.

And again, summing up his chapter on speculation, which he describes as "but a sorry tale at best . . . embracing a range of operations from mystification and petty deceit to utter fraud," he continues:

But the conclusion must be carefully avoided that, because such offences have at times been committed, American railroad finance on the whole is unsound. Such an opinion would be absolutely unfounded. A large majority of our common carriers are certainly on the whole as honestly administered as are private businesses. Nor has the integrity in the main ever been so high as it is at present.

We may then cite the evidence of Professor Ripley, and there is no more competent witness, as proving that probity and good judgment and honest administration have always been the rule; that the departures from this standard have always been few, and are now fewer than ever. The case for that state interference and minute regulation by public authorities which Professor Ripley pleads for seems hardly made out on his own facts. Indeed to an Englishman it is not clear why, because Jim Fisk robbed the Erie, railroads should be regulated. The essence of that matter is not railroading but robbery. And robbery should be regu-

*Reviewed in these columns in last week's issue.

lated not by commissioners and ministers, but by policemen and jailers. In this old-fashioned country of ours we deal with criminals of the Jim Fisk order by putting them personally in prison, and by making their estates liable in a civil action to the defrauded shareholders.

But one may go further. Before we start regulating railroad directors and officers, we surely ought to satisfy ourselves that the regulators possess the qualities which the regulatees lack. We must postulate that the personnel of legislatures, courts and commissions is superior to railroad personnel not only in intelligence and knowledge, but in honesty and impartiality. This is a subject that Professor Ripley does not discuss. He does mention that as early as 1858 the public authorities of Wisconsin were bribed as follows: Members of the senate, \$175,000; members of the assembly, \$355,000; clerks, \$16,000; governors, \$50,000. And, unlike the railroad men whose standard of integrity Professor Ripley tells us has never been so high as at present, legislators do not seem to have improved since, for on page 472 he speaks of "wholesale bribery of members of the legislature, of the press and of influential citizens" as occurring in Massachusetts within the last few years. Dishonesty of a different kind is charged by Professor Ripley against the legislature of Texas: "The conclusion is unavoidable that [owing to the Texas laws] people resident in other states have furnished Texas with transportation for which it does not pay." This dishonesty of course may not be deliberate, it may be merely stupid and unintelligent. Still it is proverbially better to deal with a knave than a fool. But presumably we may take it for granted that sheer dishonesty is infrequent; that even legislatures are imitating the railroad men and getting better. What about fairmindedness and impartiality? Shall we cite the postmaster general of the United States, or the chairman of the Iowa railroad commission as the more ideal type of the impartial regulator? As for intelligence and knowledge the case is even more patent. Nobody would claim that the members of railroad commissions know as much about the railroad business as the railroad men themselves. Would anyone claim that they were their equals in intelligence and general business capacity? If they are, why are they anxious to secure and retain appointments carrying a compensation that not merely presidents and vice-presidents, but even division superintendents and freight agents would decline to accept?

I can imagine Professor Ripley and others who share his views replying to the argument put forward above somewhat as follows: "Let us admit that in integrity and intelligence the personnel of the regulators does not surpass the personnel of the regulatees; and further that in special expert knowledge they are actually inferior. Still the regulators look at matters brought before them from a wider point of view. They take into consideration the interest of the whole community. The railroads naturally regard their own interests only." My answer would be, "Look at the facts." No one will doubt that regulation in the United States is seen at its best in the work of the Interstate Commerce Commission. No one will deny that to the disentangling of tremendously complicated issues, such as, for instance, the inter-mountain rates they have brought much patient toil and hard and clear thinking. No one will dispute that they have redressed very many grievances, not a few quite serious. But, tried by the crucial test of their action on the rates advance case last July, does one business man in a hundred doubt their lamentable failure to face a really big issue in a large way? Can it be doubted that it was the railway men who asked an increase, and not the commission who refused it who more truly represented the public interest? And does anyone doubt that the error of judgment of the Interstate Commerce Commission has cost not the railroads but the American public, millions upon millions of dollars?"

My fundamental difference with Professor Ripley is therefore that he has taken for granted that strict and detailed regulation from outside is in the public interest. He has not proved it. I do not believe that under American conditions it can be proved.

Indeed I know no country where it can. Publicity by all means, and the more of it the better; and power to interfere drastically in case of "scandals." But of interference in matters not of morality or of certainty, but of business instinct, the less the better.

I have discussed fundamentals at such length that I have left no room to deal with individual points. But I will just mention two. Is Professor Ripley sure that the decision of the Interstate Commerce Commission, even though upheld by the Supreme Court, requiring the Kansas City Southern to write off out of income the capital cost of road abandonment on re-alignment, is right from a business point of view? Suppose that a railroad makes a tunnel and then, as has often happened in England, finding that the smoke and steam of the tunnel makes operations dangerous, converts it into an open cutting, must it write off out of income so much of the cost of tunnel construction as represents its excess over the cost of the number of cubic yards of open cutting which now replaces it? Or, again, supposing a railroad constructs a long trestle over a valley, and subsequently fills in with a solid embankment, ought the timber and construction cost of the trestle to be written off out of capital? It may be prudent—all writing down of capital is prudent in a sense—but is it not a mere question of business management? Is it essential for honest accounting? And, if not, should it be peremptorily imposed *ab extra*? Is there in principle any difference between these two cases and the case of the Kansas Southern?

I am disappointed with Professor Ripley's treatment of physical valuation, which seems to me academic rather than practical. I agree that valuation was desirable, were it only to get rid once for all of what Professor Ripley frankly calls the "hoary headed bogey of over capitalization." But he assumes that it can be used as a standard against which to measure reasonable rates. How used, he does not tell us. If all the railroads of the United States were consolidated into one system, I could understand it, though even then outside competition not only of water carriage between United States points, but of Argentina and India and Siberia with the United States in the world's markets would cause some awkward puzzles. But how a reasonable rate, equal by all roads from New York to Chicago is to be connected up with the widely divergent valuations of the dozen different routes that at present compete for the traffic, I am at a loss to conceive. The problem lies so close to the surface that I am quite sure that it cannot have escaped Professor Ripley's attention. I wish he had tackled it.

Another question I think he ought to have tackled. Describing the issue of a stock dividend to the Connecticut River Railroad in 1893, Professor Ripley apparently endorses the description of the transaction by the governor of the state as "unconscionable." He adds in a note: "A lease in 1913 of the Northern Central to the Pennsylvania Railroad with a stock dividend of 40 per cent and a cash dividend of 10 per cent would appear to be a close parallel. This was long contested." It was. It was put forward by the Pennsylvania Railroad, whose financial integrity Professor Ripley does not question. It was contested, if I mistake not, before the commission of the state of Maryland and the courts. And, having run the gauntlet of full publicity and criticism, it was sanctioned. If it was "unconscionable," as Professor Ripley appears to imply, surely he ought to give his reasons, and not condemn it with a mere *ex cathedra* judgment.

Let me conclude by once more heartily thanking Professor Ripley for his book. If some of us cannot agree with him in his fundamental idea, he has at least done us the great service of compelling us to face the facts and search our own minds to see whether we can find there justification for the faith that is in us.

W. M. ACWORTH.

DOUGLAS FIR TIES IN ENGLAND.—Considerable shipments of Douglas fir railway ties from the Pacific coast have been made to England. It is stated that one English firm placed an order for twenty million feet.

Fundamental Problems Involved in Railway Valuation

A Report of the Conference Held Last Week to Discuss the Important Questions Proposed by Director Prouty

Over 200 representatives of the engineering, legal and accounting departments of the railways and about 30 state railway commissioners met with Director Prouty of the Interstate Commerce Commission Department of Valuation and his staff at Washington on Thursday, May 27, for a three-day conference and discussion of some of the important problems now confronting the federal work. To conserve time the views of the carriers were presented by representatives of the President's Conference Committee under the general direction of Thomas W. Hulme, general secretary. The states were represented by a committee of the National Association of Railway Commissioners, M. Maltbie, formerly a member of the New York Public Service Commission, First district, chairman. The conference was limited closely to a discussion of questions presented by the director in a circular issued February 4, 1915. These questions and an abstract of the replies made by the representatives of the carriers and of the states follows:

The form and manner in which the report shall be presented to the commission by the valuation division and by the commission to Congress.

(a) *What detail should be furnished Congress for the use of itself and the public?*

(b) *What detail should be served upon carriers and state commissions and other interested parties by the commission in order that the conclusions of the report may be properly checked up and verified?*

(c) *How should the report be prepared, to the end that it may be kept up to date by the federal commission and also by state commissions, if desired? Shall the valuation section used in federal and state valuation be the same?*

While this question was not included in the revised program for the conference, it was discussed by George F. Patterson, counsel, eastern group, Presidents' Conference Committee, on behalf of the carriers. He quoted those sections of the valuation act outlining the form and manner in which the report is required to be presented by the department of valuation to the Interstate Commerce Commission and through it to Congress. He maintained that if the report to Congress is to be evidentiary to the subsequent proceedings under the Interstate Commerce Act, the detailed records in the commission's office must be so connected by record reference or order that all the information obtained by the commission can be produced in any proceedings. The final report to Congress must contain not only the final value of the property reported on, but all the facts and elements of values upon which the final figures are determined, so that if necessary the court can ascertain for itself the fair final value.

Secretary Hulme discussed the last part of the question, recommending the report on the New Orleans, Texas & Mexico as an example of the detail which should be shown in the final report. In reply to a question by Director Prouty he stated that it was the belief of the carriers that the information required by the commission's valuation order No. 3 with reference to additions, betterments and deletions was all that would be serviceable in keeping the inventories of the quantities up to date. He emphasized the fact that the prices applied to the original valuation would change from time to time so that the value of the property as a whole at any later date must be ascertained in the same manner as the commission is now making its valuation.

In determining "cost of reproduction new," to what extent should reference be had to conditions as they existed at the time of the original construction?

In determining the "cost of reproduction new," E. Holbrook, consulting engineer, Union Pacific, divided the construction of

a road into four periods; the promotion, organization, assembling and development, all of which must be considered in reproducing a property. A carefully considered program of construction work must be prepared in the light of the best and most economical methods of the present day. He illustrated this by describing the "reconstruction new" of the Union Pacific today. As over 11,000,000 tons of ballast would be required for this road, all of which would be secured from a point west of Cheyenne, Wyo., it would be advisable to start the reconstruction of this road at the connection with the Colorado & Southern at Cheyenne and build both ways from this point. Work would also be started westward from Omaha and Kansas City. In reply to a question from Director Prouty, Mr. Holbrook stated that while a road could be placed in operation before it was able to operate at a profit, it must receive compensation in some other way if an attempt was made to secure the lowest cost of reproduction. He emphasized the necessity of studying each problem separately, and also urged consideration of the large amount necessarily spent for temporary structures in the building of a new line to hasten the work, citing the building of the timber bridges and the line over the summit of the Cascade mountains on the Puget Sound extension of the St. Paul, all of which have since been replaced.

The answer to this question by the state commissions was made by M. Maltbie, that as a general principle the "cost of reproduction new" should be determined on the basis of present conditions. The discussion of this and the other questions by the state commissioners was in most cases confined to a brief explanation of their answers.

(a) *Should an allowance be made for clearing and grubbing, and, if so, shall it be allowed where the road runs through what is now tillage land, but what was at the time of construction a forest?*

H. C. Phillips, valuation engineer, Atchison, Topeka & Santa Fe, replied for the carriers that as clearing and grubbing are essentially grading items, if the records of the carriers show that such work was done, it should be allowed the same as other excavation, even though all evidences of the existence have disappeared.

Mr. Maltbie replied to this question for the state commissioners that clearing and grubbing should not be allowed if the adjacent land is now tillage land and is now valued as such, but that allowance should be made for grubbing if the adjacent land is cleared and not grubbed, basing his reply on the fact that he considered the problem to be one of ascertaining the cost of reproduction new and not the original cost or the fair value.

(b) *The road runs through an orchard which did not exist at the time of original construction. In determining cost of reproduction new, shall the value of the land be determined with or without the trees?*

E. Holbrook replied for the carriers that the value of the trees should be included in the damages paid, while the value of the land should be that of adjacent land used for orchard purposes. The reply of Mr. Maltbie was that the value of the land should be determined without any allowance for trees.

(c) *A building was wrecked when the road was constructed. Is the expense of wrecking to be included in the reproductive cost?*

E. Holbrook replied for the carriers that it should be assumed that at least an equal number of buildings would be on property today, and that therefore the cost of wrecking buildings when the road was constructed should be included. The answer of the state commissioners was "no."

(d) *Are present geological and topographical conditions to be taken, or is inquiry to be made as to what these conditions were at the time of original construction?*

E. Holbrook stated that the geological conditions existing at the time of construction must still be considered to exist and that a rock cut originally is still a rock cut. In estimating the cost of reproduction, geographical and topographical conditions should be taken as of the time of original construction, except where they have been changed, due to mining or other conditions which create difficulties which would have to be met today.

The reply of the state commissioners was that present conditions should be taken.

(c) Should it be assumed that present transportation facilities are in effect, or must reference be had to such facilities as existed when the road was constructed?

Pierce Butler, counsel for the western group, Presidents' Conference Committee, outlined the position of the carriers that all roads now in existence shall be considered to be in existence other than those of the carrier under consideration. The representatives of the state agreed with this answer. Director Prouty asked Mr. Maltbie if a highway, the moving of which was made necessary by the construction of a railroad at its own expense, should be considered in its original or present location. Mr. Maltbie replied that it was necessary to consider present conditions, but that the valuation department should report such data as an aid in the determination of the fair final value.

Should the road be reproduced in the form and manner in which it was originally built?

(a) For example, gravel was brought from a considerable distance in point of fact, but a gravel bank is today available at much less cost. Shall the road be allowed the haul which was actually made?

(b) The rail originally laid was relay. In determining cost of reproduction new, should we apply the relay price or the price of new rail?

(c) The rail now in branch lines or sidings was originally laid new in the main track and taken from there to the branch or siding. Shall this be treated as new rail and priced and depreciated accordingly, or shall it be treated as relay rail when laid?

W. L. Seddon, assistant to the president, Seaboard Air Line, replied in behalf of the carriers that a road should be reproduced in the form, but not necessarily in the manner originally built, but that it should be built according to the present day modern methods, securing materials at the most economical places. Transportation facilities other than those of the carrier assumed to be under reproduction, should be considered to be in existence to bring construction material onto the property under consideration. Thus, if gravel and other material can be obtained today by more economical sources than originally, it should be so obtained.

Mr. Maltbie replied for the states that the form and manner in which the road was originally built has nothing to do with the cost to reproduce it new unless the original plan and manner were in accordance with present good practice. He agreed with the carriers that gravel should be secured from the nearest available source.

The reply of the carriers to the last two sections of this question was that the price of new rails should be used. Mr. Maltbie answered that relay prices should be used where the present rail is relay rail and the price new where the present rail was new when laid in its present position. His answer to the last section of the question was that the rail should be treated as relay rail at relay prices. The customary practice is to place relay rail on sidings when built and the "cost of reproduction new" should not consider the use of new rail in such track since it is not in accordance with good practice. In reply to a question by Director Prouty, Mr. Maltbie stated that relay rail should be considered as bought in the open market and that freight should be added. He stated that the fair value of such rail would probably be the same when using the relay price or the price of new rail depreciated.

What overhead charges should be allowed and in what amount? By overhead charges are meant items like engineering,

contingencies, interest, taxes, etc. How shall the time necessary to reproduce the property be determined?

Pierce Butler outlined the position of the carriers that allowance should be made for all necessary overhead charges, such as organization expenses, financing, administration during construction, legal and engineering expenditures, and interest during construction. There should also be included a proper amount for material on hand and working capital. In considering this problem a property must be considered non-existent and a definite program of construction worked out.

Charles Hansel, consulting valuation engineer, Pennsylvania Railroad, discussed the overhead engineering charges. Previous to 1907 all engineering charges were not allocated so the records of the carriers do not show the complete cost of this item today. A study of the overhead engineering charges on 7,000 miles of line has recently been made. On 4,300 miles in the west the average cost for engineering, excluding charges allocated to land and equipment was 4.1 per cent of the expenditures. Similarly on 800 miles of line constructed in the east this charge was 5.79 per cent, while on 1,700 miles of line constructed in the south this figure was 4.4 per cent, including in this latter case engineering expenditures incurred in the acquisition of land. On the basis of these figures he recommended that in the estimated cost of reproduction the minimum to be allowed for engineering should be five per cent for road accounts, exclusive of land. Since it has been the general practice to add two per cent to equipment cost for engineering, he recommended that this figure be adopted for such accounts until a more accurate figure can be ascertained.

E. Holbrook outlined the position of the carriers regarding contingencies, calling attention to many ways in which an estimate of the cost of reproduction of the property will necessarily fail to include all the proper costs, such as those resulting from storms, personal injuries, delays of transportation, etc. He urged that the percentage for contingencies should be stated for each account rather than being applied to the whole, as this item can be determined closely for some accounts, while not as closely for others. Different percentages should also be applied to the same account on different roads because of the difference of the completeness of the records.

W. E. Bailey, general auditor, Atchison, Topeka & Santa Fe, discussed the subject of interest during construction in which he stated that at the beginning of any year prudent management required that an amount of money equal to the estimated expenditure for construction during that year should be available. While the interest rate would vary in different sections of the country according to local conditions and the hazards of the enterprise, a minimum rate of six per cent should be allowed, while in many cases seven per cent or even more would be necessary.

A. H. Plant, comptroller, Southern, asked that the carriers be given an allowance no greater than the actual expenses necessarily incurred in bringing about arrangements for the leasing of railroads of other companies and for arranging for traffic rights over other lines. He referred to systems made up of lines owned outright, those with trackage rights and those leased, stating that a considerable expenditure was required to join these into one system. Where lines are operated under lease, separate valuations are made for each of the constituent properties and none of these valuations will show this development expense.

Mr. Maltbie outlined the position of the state commissioners on the general subject of overhead charges, by stating that such charges should be allowed on the basis of the present normal cost of such items as determined by actual experience in railroad construction under similar conditions. Overhead charges should include engineering, contingencies, interest and taxes during construction on the above basis, but no separate allowance should be made if such charges were included in the unit prices of material or elsewhere. The normal method of constructing railroads in sections should be adopted as a basis for determining the period of construction. He called attention to the fact that the cost of engineering on equipment items is frequently included in the prices paid for equipment, and should not therefore be al-

lowed again. He opposed considering unusual conditions, such as earthquakes, those leading to the failure of the Quebec bridge, etc., in making allowances for contingencies. He also opposed allowing overhead charges for the consolidation of lines into a system because of the possibility of this leading to absurd results.

Shall allowance be made for appreciation; and if so, as to what parts of the property? Shall account be taken of solidification and adaptation; and, if so, shall this be by addition of a percentage to all grading quantities?

What allowance, if any, shall be made for shrink or swell in determining quantities as shown by actual measurement in present embankment, and shall this allowance be made by reference to local conditions or by some uniform per cent?

W. G. Brantley, counsel, Southern group. Presidents' Conference Committee, opened the discussion of this subject on behalf of the carriers, quoting numerous court decisions showing the necessity for including allowances for appreciation. H. C. Phillips pointed out the improvement in an old well-established line as compared with a new one, showing that the former is a more valuable transportation tool and that therefore an allowance for its appreciation should be made. He defined adaptation as an adjustment of the physical line to its environments and purposes. The value of a property, as outlined in the present valuation act, is not concerned with the source of the money or whether it is secured from capital account or operating revenues. Aside from the roadbed and ballast, appreciation is largely confined to drainage and the adjustment of the line to traffic conditions, all of which are necessary to the development of the property.

In the various valuations which have been made by the state no attempt has been made to deny the existence of this value, although it has not always been allowed because of the difficulty in its determination. He suggested an allowance of two per cent per year for five years on all earth and loose rock quantities, and one per cent per year for five years on solid rock, with an addition of \$600 per mile to cover additional maintenance charges. While an allowance should be made for shrinkage, no uniform percentage can apply for materials vary greatly in this regard. Each item must be studied in accordance with its nature and the methods used in construction.

Mr. Maltbie replied for the states that no allowance should be made for solidification and adaptation beyond the charges actually and necessarily made to investment account. In reply to a question of Director Prouty, Mr. Maltbie admitted that the roadbed became better as it seasoned, but stated that as the road was permitted to charge depreciation to operating it was not unjust to refuse to allow appreciation. He opposed allowing it because he stated that it represents no sacrifice on the part of the investor.

How shall depreciation be determined?

(a) By mortality tables? If used, shall these be general or made with reference to the property of each carrier?

(b) By actual observation?

(c) By combination of these two methods? If by combination, what weight shall be attached to age and what to the observed condition?

(d) Should obsolescence and inadequacy be considered?

W. G. Brantley stated on behalf of the carriers that the period of time required for the construction of any large railroad property covered such a period of years that all of the parts could not be new upon the completion of construction, that a condition of absolute newness could never be ascertained and that upon the completion of the property the owners would have made an investment considerably greater than would be found by a detailed examination of the component parts as ascertained by the government engineer. Depreciation cannot be determined by any rule of thumb, but only by the exercise of mature judgment after learning all the facts.

Deterioration is a matter of record, but the question of whether this affects the value of a composite property is a matter of law. If a property is not neglected to a point affecting its operation he maintained that there is no depreciation in its value as a

whole, or in the transportation machine, although there will exist deterioration of the individual parts. Depreciation should be determined by a careful study of the records of the particular carrier, followed by an actual inspection of the property, made by a joint inspection party composed of experts representing both the government and the carrier. A standard of operating condition appropriate for the particular portion of the property under valuation should be determined upon by a study of the conditions required to be met by such property. Depreciation should not be determined by general mortality tables, for such tables being tables of averages cannot be closely followed in dealing with a particular property. Neither the age alone, nor the observed condition alone of the particular property, nor both combined, should finally determine the amount of the depreciation. Due weight should be given to each of these factors, but there is also to be considered the conditions required to be met by the particular property and the probable length of useful service life remaining in the property as indicated by the records of the carrier. In ascertaining "cost of reproduction new" and "cost of reproduction less depreciation," under the Act, depreciation due to obsolescence and inadequacy, if any, should not be considered because it is the cost of reproducing that particular piece of property under consideration. In determining the value of the property as a whole, if there exists depreciation due to obsolescence and inadequacy actually affecting such value, the same may be considered.

This question was answered by the state commissioners as follows: Deferred maintenance, if any, should first be determined. The age to date of appraisal and its scrap value shall be ascertained. The expected life shall be determined after inspection, examination of records and consideration of all parts that affect the period of usefulness. The accrued depreciation shall then be ascertained by the ratio which the age to date bears to the total life applied to the cost, less scrap value. Deferred maintenance should be added to this amount.

Mr. Prouty asked Mr. Maltbie when deferred maintenance began, to which he replied that this is a question of maintenance which the engineers must determine from some accepted standards. Mr. Prouty also asked whether if one road had a high standard of maintenance and another a low standard, would the road with the low standard be considered to have deferred maintenance? Mr. Maltbie replied to this that a road with a considerable deferred maintenance may still be able to serve the public satisfactorily. Mr. Maltbie stated that it was the idea of the state commission that depreciation must be shown separately for each unit of property. If this was done, it would then be difficult not to show depreciation on the road as a whole. In the period of years immediately following the construction the depreciation fund is not set aside in a bank by the railroad, but is invested in additional property of the carriers. As an inventory will then include this new property as representing original investment he considered it fair to consider depreciation. He pointed out that expenditures for maintenance alone are not sufficient but that provision must be made for ultimate replacement, illustrating by the fact that it is not only necessary to paint a car but to provide for its ultimate replacement. In reply to a question by Mr. Staples of the valuation board, Mr. Maltbie stated that the same rule cannot be applied to different properties and that conditions vary widely. In considering depreciation due to inadequacy and obsolescence it was not possible to consider that this would be the same in the future as in the past, and that it should only be based on the judgment of present conditions and those now foreseen. Mr. Maltbie expressed the opinion that the deferred maintenance will not be found important on most roads in the final analysis as he believed they are generally well maintained.

How shall unit prices be determined? If for an average period, what shall that period be and shall it be the same for all railroads, no matter as of what date they are valued?

What allowance shall be made for the cost of transportation of men and materials over the line of the carrier itself while under construction?

G. W. Kittredge, chief engineer, New York Central, stated for the carriers that in order that the cost of reproduction new may be estimated by the same measure for all carriers it is necessary that the price bases for determining the costs of materials and labor shall be the same as to time for all carriers. As the date June 30, 1914, is being used for the roads now under valuation, he advocated the continued use of this date. Where prices of this date are normally high or low because of business conditions, average prices for a number of years, not less than five or more than ten, preceding June 30, 1914, should be used. In determining unit prices it must be considered that construction work is carried on throughout the year and climatic conditions therefore must be given due weight. On those portions of the system under which the construction program is assumed to be completed, allowance should be made for the cost of transportation of men and materials at tariff rates. On those portions of the line under construction the actual cost of such transportation should be allowed.

Mr. Maltbie replied for the states that unit prices should be determined by an examination of contracts, records of actual cost and other available information covering a number of roads in that part of the country where the valuation is being made. The average prices for a period of time shall be taken, such periods being so fixed as to secure normal prices. Transportation should be charged at the actual and necessary net cost to the carrier.

How should the "present value" of lands used for transportation purposes be determined?

Should the cost of acquiring the right of way at the present time be determined and stated as a part of the cost of reproduction new?

The act calls for "the present cost of condemnation and damages in excess of present value of lands." What is the meaning of this phrase and how shall the information called for be arrived at?

What is meant by "each piece of property" as used in the paragraph of the Valuation Act designated "First"?

What is meant by "terminals" as used in the paragraph designated "Second"?

In discussing the "present value" of land, Pierce Butler spoke at length of the attitude of the courts on this subject. He stated that the present value of each piece of land used for transportation purposes must be determined upon the same principles which govern in the case of condemnation of private property for public use. In reply to Director Prouty's statement that many roads were built long ago, Mr. Butler stated that no matter how or when the land was acquired, the same principles governed. In the consideration of right of way, station grounds, terminals, etc., the value of the whole is also greater than the sum of the values of the individual parcels comprising the same because the elements of continuity, shape, etc., must be considered.

Mr. Butler called attention to the fact that the Valuation Act was passed March 1, 1913, at a time when the arguments had been made in the Minnesota, Arkansas and Missouri rate cases, but before decisions had been rendered. At this time there was a wide difference of opinion regarding the land question, and Congress therefore required each piece of property to be listed with three values and other elements of value, if any, the purpose of the act being to require the commission to ascertain all the facts so that the data would be on hand to comply with any theory of valuation or rate making. He quoted at length from the decision of the Minnesota rate case and drew the conclusion that this decision did not consider the "fair market value" to be that value for other purpose but what a railroad was required to pay. He cited numerous other decisions showing that an owner is entitled to a "fair market value" of this land, taking into consideration every use for which it may be needed. The value of land is what it costs when purchased prudently.

Secretary Hulme replied, "Yes" to the second subdivision of this question on behalf of the carriers, outlining numerous ways in which the cost of the land is increased above normal acreage

prices in large tracts. In reply to the third subdivision of the question he gave numerous figures of the cost of condemnation proceedings on different roads. When acquiring property for extensive second track work on the Norfolk & Western in 1912 and 1913, the average cost of condemnation proceedings was \$175 with the awards varying from \$25 to \$200. In valuing property he called attention to the impossibility of establishing zones in cities and to the necessity of considering conditions as actually found on each piece of property.

The reply of the states as outlined by Mr. Maltbie was that the present value (as used in paragraph "second" of section 19-a of the Valuation Act) of land used for transportation purposes should be determined from the value of similar adjacent land. The answer to subdivision a was, Yes, and to subdivision b, that the phrase means, present, reasonable and necessary cost as shown by existing local conditions. Information should be secured by investigation. The answer to subdivision c, was, that the law contemplates the classification of property and appraisal of each class, due regard being had for large or peculiar units of property.

When are lands "owned or used" for common-carrier purposes? Should lands in any case be classified as held for common-carrier purposes unless they are actually so used?

When are lands "dedicated" to the public use?

Thomas Cooper spoke for the carriers in reply to this question, stating that land actually used for common carrier purposes should be valued as such irrespective of whether owned or not. Land owned and held for future common carrier purposes in anticipation of reasonable need therefor, should be valued as common carrier land, irrespective of whether now actually used or not. Land owned or held for purposes other than those of a common carrier should be valued under paragraph numbered "third." Lands are dedicated to public use within the meaning of this act when originally acquired for the purposes of a common carrier by the present or any predecessor common carrier but where the lands were acquired for other than the purposes of a common carrier the time of dedication to public use shall be taken to be the time when the intention was formed to hold the land for common carrier purposes.

Mr. Maltbie replied to this question that lands to be appraised as "owned or used" for common carrier purposes or dedicated to public use should be only land actually so used, and land needed for such use in the immediate future.

When original cost can not be shown from the books of the carrier, shall an estimate be made?

Secretary Hulme replied to this question that where records of original cost are incomplete, there is no use in making an estimate of the original cost, but that where carriers' records are complete an estimate of the original cost may be of use. A study of the records of the carriers shows that those of many roads have been destroyed by fire or lost.

Mr. Maltbie replied that since the original cost represents the sacrifice of the investors, the determination of this amount was exceedingly important. Director Prouty called his attention to the fact that the original cost and the actual investment may be widely different.

Should the value of equipment be apportioned between different states; and, if so, upon what basis shall the distribution be made?

Shall the value of a great terminal—like, for instance, the Pennsylvania passenger station in New York—be distributed; and, if so, upon what basis?

George F. Patterson replied to this question on behalf of the roads, calling attention to the fact that the Valuation Act provides that the value of the property as a whole and separately as to states and territories must be determined, and that the notes of the tentative valuations shall be given to the governor of any state. It is therefore necessary for the commission to divide the property between states. This is not a serious problem as far as lands and other real property are concerned. The situs of real estate is the state in which it is located. The value of terminal property such as that of the Pennsylvania in New

York should be allocated to the state in which it is situated. The same applies to personal property such as tools. With reference to movable property such as equipment, he outlined four methods for its distribution on the basis (1) equipment days, (2) ton miles, (3) miles of track, (4) car mileage. He recommended that equipment used only in one state or a few states, be assigned to those states, and that the balance be apportioned on the basis of locomotive or car miles. Work equipment could be assigned either on the basis of miles of line maintained or in proportion to the maintenance of way expenses. The car mileage should include both revenue and non-revenue and would also include privately owned equipment.

The committee of the states was in substantial agreement with this reply of the carriers except that they would exclude privately owned equipment. Mr. Patterson contended that in valuing the property the private cars bore the same relation to the road as those owned directly. He would not, however, value foreign cars where found.

Although not included in the revised program, Sanford Robinson, assistant counsel, Eastern group, Presidents' Conference Committee, presented the ideas of the carriers regarding the allowances to be made for going value, location value, earning capacity and other intangible values. He called attention to the Valuation Act requiring the inclusion of all values, and to the discussions on the floor of the Senate where the act was revised to include such values and all reference to the physical valuation alone was eliminated. He quoted from numerous court decisions showing the necessity for the inclusion of such values.

M. Atkinson, chairman, Missouri Public Service Commission, called the attention of Director Prouty to the demands in Missouri for the separation of the properties used for freight and passenger service, and asked that the commission consider the development of a formula to bring out this information. He stated that the valuation now being conducted by the Interstate Commerce Commission is of little value from this standpoint.

Mr. Maltbie asked on behalf of the states that where appraisals have been made by states, the division made in these valuations shall be followed by the Interstate Commerce Commission so that the data so obtained may be of use to the states. Mr. Hulme replied for the carriers that the roads have no objection to this in those states where the sections were determined by the convenience of the work, but that there might be objections where such sections were determined arbitrarily. The determination of valuation sections could be determined after a conference with the carriers.

As both the carriers and the states desire further time to prepare written briefs upon these various questions, Director Prouty gave the carriers to June 15, to file such briefs, and the states one week later to file their briefs and reply to the carriers.

A BILLION DOLLAR CONFISCATION

By MORRELL WALKER GAINES

In an age of economic vivisection the railroads have been the subjects for the chief experiments and the major operations. Rate theories, valuation processes, new ideas in finance and corrective principles in accounting and operation are being applied to them by powerful federal and state commissions. Their actual administration has been assumed by these bodies in such generous measure that the supremacy of authority over responsibility is now become barren and oppressive. Theory, as ordered and symmetrical as the Garden of Eden in the New England Primer, shoulders to one side experience, rough grown from the soil of struggle. It is a day of counsels of perfection, of control dependent on statute and free of natural law. The investment in railroads meets the common fate of barriers across the flow of governmental regulation. It is tossed about as if it were a toy, to be broken and mended at will.

One of the foremost of the regulatory abstractions, disdainful of evolutionary imperfections and yet itself powerless

to produce life and growth, is the project of establishing a valuation of railroad properties. Upon the value when found there is to be decreed a fair and compensating return. It is a valorization downwards. In seeking value the Interstate Commerce Commission turns toward cost, availing itself of fragmentary history and arbitrary estimate. It is, and must be, unbiased by market price, which is the accepted valuation of railroad properties. The re-valuation is thus the application of a brand new acid test to securities. Where hitherto their place in the market has rested on earning power, it must come now to stand on assets, as marshaled and appraised by an extraneous agency, impatient of the existing order.

Valuation of the entire railroad system is still a dim and colossal project of the future. Ten years of field labor and the expenditure of fifty millions of dollars will, perhaps, bring the program to the beginning of the era of court decisions and of working results. But in the meantime the theory of valuation has permeated the Interstate Commerce Commission's accounting orders. The foot of the camel is within the tent of railroad management. The equipment depreciation regulations, as now prescribed, are a form of valuation accounting which strikes at both assets and earnings. They have resurrected from the past a deficiency of a billion dollars of value alleged to be lost, and charged it against the present, and have increased the operating expenses over a period of years, independently, in almost equal amount. These regulations impose a burden which translates itself to stocks and bonds, to construction and improvements, and is conducive to an increasing paralysis of development.

The spontaneity and freedom of railroad growth and adaptation, in other and more flourishing days, was due to a different conception of values, supported by a different method of accounting for equipment. On the whole, the cost of the railroads of the United States has been a speculation in transportation futures. They were financed and built for what they could earn. All value lay in the earning power and the construction and purchase of road and equipment was regarded as an initial outlay, or sunk investment, for the sake of the perpetual annuity from the traffic. Charges to property account showed what had been paid out and not what was coming in. If now a valuation is made that may deduct depreciation, losses and mistakes from the money, or securities, expended, and the income is then limited to a fair return upon this valuation, the case is so altered that there can be no more speculation in railroad construction in the free sense of the past. Few will have the temerity to venture the heavy investment involved in going long of transportation by building railways.

Until 1907 the railroads had, with the sanction and by the express command of the Interstate Commerce Commission, kept up their equipment by charging renewals to expenses, without creating funds or reserves for replacements in advance of the actual destruction. As the roads had been built, so were they operated. The quota of cars and locomotives was treated as incident to the general capital outlay for construction, and the cost was part of the investment sunk against future traffic. The income created by the aggregate expenditure should take care of all regularly recurring repairs, renewals and replacements due to use and age. To add to it by formal reserves would have been either to duplicate invested capital or to cut in two expected income. That this was a sound working theory is proved by the unusual vigor and rapid progress of the American transportation system, which attracted, and sustained, an investment of fifteen billion dollars from the financial markets of the world.

In 1907 the Interstate Commerce Commission issued the Third Revised Classification of Operating Expenses, requiring the railroads to charge to operating expenses each month, for depreciation, "a certain rate per cent" on the cost, or book or estimated value, of locomotives, passenger and freight cars, to be set up as a reserve. No percentage rate was officially prescribed. The depreciation reserve of 1907 could be used for replacements, for purchase of additional cars, or for retirement of car trusts. This was, at the beginning, a mild form of depreciation accounting, aimed at keeping the value of equipment up to the existing

level with greater uniformity than under the superseded renewals charges. It added no burden to expenses.

In 1909 a progressive change began under which it was sought to compel the railroads to maintain equipment at its original, or cost, value, and to throw the difference between that value and the normal, or used, value into the expense and the profit and loss accounts. At first it was ruled that the depreciation reserve could not be used for replacements, but that cars destroyed should be charged to it. In 1910, a year later, more complete regulations were issued providing that the reserves could not be used for any purpose at all, except, mite by mite, as the individual cars against which depreciation was accrued, came in course of time to be destroyed. Thus depreciation was changed from a pooled reserve, available for general equipment needs, to a unit reserve available only for the individual car and locomotive when worn out.

The regulations now finally in effect provide that depreciation must be accrued separately on each car and engine, month by month, and that each unit of equipment sold, destroyed or retired from service shall be credited to capital account, with the appropriate charges to materials account for salvage, to the depreciation reserve for the amount of depreciation already set up against that unit, to profit and loss for the estimated depreciation accrued prior to 1907, and to expenses (retirements) for whatever balance of original cost may remain after deducting the salvage and depreciation. The theory of these highly technical requirements was explained in 1912. "The replacement (depreciation) reserve is not to be closed out, and is not exhausted as long as the road is in operation. At all times it stands as the measure of depreciation."

It is necessary to state the depreciation regulations in order that discussion may not appear a mere vault from premise to conclusion. But it is not necessary to follow out in their entirety the complicated bookkeeping entries. The grounds for objection lie not so much in the narrowness of the concept and the tedious and costly detail of its application, as in the unsound principles upon which the orders are, quite logically, based. The regulations constitute a thrust at values in two different directions, the channels of attack being the profit and loss account and the operating expenses.

With respect to profit and loss the case is simple. Railroad equipment has cost, on a rough estimate deduced from the number of cars and engines owned, upwards of three billion dollars. The age of this equipment averages, probably, eleven to twelve years, or over 40 per cent of a term of natural life that may be taken, for purposes of calculation, as twenty-five years. By simple arithmetic the depreciation already accrued, on the percentage basis, amounts to upwards of one and one-quarter billions of dollars. Depreciation accrued prior to 1907 was one billion dollars, and this amount the regulations formally require the railroads to charge, gradually, to profit and loss surplus. The profit and loss surplus of the railroads of the United States amounted to \$750,000,000 in 1907, and to \$1,039,000,000 in 1910, when the order was promulgated, according to the report of the Interstate Commerce Commission itself. It is not, today, large enough to carry the burden which the new depreciation accounting has sought to impose on it.

The edge, but not the weight, is taken from the process of subtraction by the fact that it is to be spread out over the term of years during which equipment on hand in 1910 shall come, through age and wreck, to retirement. The commission and the railroads are alike hopeful that a new and larger surplus will have been created in this time to meet the brunt of the depletion with better grace than would be possible now. But, even in this view, a surplus is a commodity of varying distribution. Some roads have an abundance, others little. The difficulty is not only that the general margin of safety and profit built up in three generations of railroad operation is annulled, but that individual roads will be forced into deficits, if they follow the accounting through.

In principle the sums taken from accrued surpluses are profits earned in the years before 1907, profits earned and largely paid

out in the form of dividends, ten, thirty or even fifty years ago. These profits and these distributed dividends are required to be paid back through depreciation by the stockholders of the present and the immediate future, although they had been properly made, and properly accounted for during the best part of a generation under rules devised by the Interstate Commerce Commission itself. The accounting for accrued depreciation is retroactive and, clearly, confiscatory.

With respect to expenses the case is more complex. The burden on expense, although a much more serious matter from the practical standpoint, has hardly been generally recognized or understood. Theoretically the current depreciation charged expenses is exactly equal to the annual cost of renewals, on a seasoned road, making good the perennial wastage of cars and locomotives in operation. The increase in expenses arises from the unit system of accruing the depreciation, which makes the roads carry a double burden of renewals and depreciation simultaneously, for an initial period of twenty to twenty-five years.

Each car has its separate reserve. That reserve takes, say twenty-five years, to fill, at the regular percentage rate, to the point where it is adequate to take care of the car against which it stands. It cannot be charged against for another car, or for any other purpose. Cars have a mortality from casualties that is a large share of their total death rate. Furthermore, they may become obsolete from various causes, and are in no sense close observers of the average term of life on which the depreciation is figured. Accordingly a very large number of cars will be retired before their respective depreciation reserves have been built up to the point of providing completely for their cost. The unprovided balance of cost must, under the rules, be charged expenses under the heading of retirements. The company's expenses are therefore increased because the aggregate of the depreciation charges is already, if correctly calculated, equal to the normal annual charge to cover cars destroyed.

Or, to state the case the other way about, a large share of the depreciation charge, for a period of twenty-five years, is an addition to the renewals expense that a railroad would have had to carry if it were maintaining its equipment under the old style of accounting, without depreciation. This increase in expense is not accompanied by any compensating increase in physical maintenance, but is an accounting requirement pure and simple.

Expenses are also increased in three other ways.

Cars of abnormally long life, if owned in 1907, should bring a burden similar to that pertaining to cars of short life. For, the commission has ruled that the charge to expenses for depreciation must be continued until the unit of equipment has been written down to the salvage value, although in the case of old cars much of the depreciation accrued prior to 1907. Thus in the end some considerable part of the heavy toll directed at profit and loss, for past depreciation prior to 1907, will be in fact transferred to the expense account, where it can be borne with greater difficulty.

During the years 1907 to 1914, a large number of roads made only a half-hearted and technical compliance with the depreciation instructions. They used a low percentage rate, insufficient to meet the theoretical requirement based on probable life. The deficiency of the reserves accrued in these seven years must also be made up through expenses, as the cars owned during that period come to be destroyed.

Finally, wherever profit and loss surpluses are exhausted, as a source of depreciation, there will be a tendency to use the expense account to fill the breach. Many conservative railroads are unwilling to draw upon profit and loss for this purpose and are actually charging the entire cost to expenses.

The factors dealt with by the depreciation regulations are of great magnitude. The sum of these four items, even on the assumption that they apply altogether to no more than 40 per cent in value of the aggregate equipment now owned, means an increase of expense that a billion dollars would hardly cover.

It is true that the increase in expenses is spread, in irregular

fashion, over a period of twenty-five years, after which time depreciation imposes no increase in expense. But this period is too short to make the burden equable and too long to allow the investment level of securities to escape its weight. The swelling of the expenses of an arbitrarily selected term of years over and above what is properly the expense of that period is unfortunate for security holders. The revenues applicable to interest and dividends are decreased, the outlook is darkened and the depreciation supercharge comes in the last analysis and to an exaggerated extent out of the present value of stocks and bonds.

As the depreciation reserves are accrued they must be credited to cost of equipment, or stand as an offset against that cost. That is to say, they are in effect deducted from the value of the equipment asset as it stands on the balance sheet, one of the objects of the whole accounting process being the establishment of what is considered by the commission to be a correct valuation for the equipment. When the process is completed, and the reserves are full, the books will, accordingly, indicate some ten per cent of their entire construction investment to have been returned to the railroads in the form of a depreciation reserve. Rates on traffic, if the commission's depreciation theory has the validity as a basis for transportation charges which one section of the railroad valuation law appears to assign to it, must yield a reasonable return upon the remaining 90 per cent only. This is a permanent effect, entirely distinct from the depletion of surplus and increase of expenses, and it is equivalent to another loss to security holders, whenever valuation shall assume effective control over rates, amounting to well over a billion dollars.

Influences of gradual depression act like slow poison. Their direct effect is not conspicuous, even if the general condition is deteriorating. The strong and vigorous throw off the influence, and the first signs of disaster are with the sick and enfeebled. Up to the present time no very great emphasis has been laid by the railroads on the depreciation accounting as one of the larger, among the many, burdens under which they have been approaching a condition of distress. This is especially true, because the wealthier roads do not object to padding their maintenance accounts by means of the depreciation surcharge, while others have hardly begun to make the full percentage compliance with the regulations. Nevertheless, the ultimate goal of the depreciation accounting has already been fully demonstrated, and especially in the case of financially embarrassed railroads.

A large system in the hands of receivers recently defaulted the interest on its underlying bonds, small issues whose protected position had made them absolutely secure in the eyes of investors. Upon the appearance of the annual report it developed that the amount required to pay this interest had been applied by the receivers, under direction of the court, to the depreciation charges. Including a similar accounting requirement in connection with abandoned property, the Interstate Commerce Commission had put two million dollars into expenses, and brought up the operating ratio to 106 per cent, the money so represented being diverted from the physical property instead of put into it, in so far as the unit system of reserves could accomplish this result. This is a somewhat onerous impost for a company in struggle to rehabilitate itself for reorganization. The defaults were of a type previously thought impossible, under any stress of circumstances, and they added a deeper shade to the discredit in which, especially in foreign markets, American railroad securities had come to be held.

Another of the larger systems proposed some time ago to readjust its finances. It had had no mortgage bonds or other salable securities upon which to raise money and, for this reason, its traffic facilities had become inadequate and outgrown and, in the endeavor to keep up its service, it had accumulated a large floating debt. In order to have a sound basis of fact upon which the readjusted corporation could ask of investors the new cash needed in rehabilitation, chartered public ac-

countants were called in to verify, and restate, the books of account. This is the necessary procedure in reorganization. But the accountants insisted that the books of a reorganized company should write off at the outset the past depreciation on equipment which the regulations require living companies to write off gradually. It would not be proper for a new company to enter as an asset the loss of the old. The amount of the accrued depreciation was of sufficient magnitude to convert the corporate surplus into a heavy deficit. As there is no way of issuing securities against a deficit, naturally the financial readjustment became impossible.

Both of these instances are typical of what will happen on a larger and more general scale, if the depreciation regulations are to apply to the numerous companies now in difficulties or insolvent which must, at some time, be reorganized. In the past a bankrupt railroad has paid what it could; fixed interest obligations to the extent of the assured earning power, adjustment bonds and preferred stock to cover probable earnings after convalescence and recovery, and common stock against the hope of the more distant future. This was no more than honest to creditors, and at the same time it provided the only way of attracting liberal supplies of new capital for reconstruction and development. The chance of participating in the revived prosperity after reorganization has, in fact, been the mainstay of strength behind a very large proportion of American railroad securities. But the depreciation accounting cuts off this mainstay. If the theoretical loss on used equipment must be taken into account by corporations formed in reorganization, properties coming out from receivership must cut off their stock and scale down their bonds. Otherwise the liabilities will exceed the assets, and the securities become illegal. Theories of valuation, as applied to equipment depreciation, imply reorganizations of a drastic and circumscribed type, the disastrous effects of which will tend to taint the standing of railroad investments as a class.

The principle followed by the Interstate Commerce Commission in its depreciation regulations is simple, and rests logically upon the idea that railroad assets are subject to valuation as a basis for rates. Cars and locomotives wear out. They are therefore a wasting asset. The waste is continuous, and must be construed as an impairment of capital and of profits, to be balanced by reserves. From a purely abstract point of view this inventory theory of the commission has as much in its favor as the investment theory of the railroad builders, that the equipment in use should stand at cost.

But the results of the commission's idea are destructive. It replaces a vitally constructive principle. Furthermore, it is hardly just to wipe out surplus and overload current expenses for the sake of enforcing a change in methods of accounting. In fairness to railroads and to investors, the commission should offer some reasonable basis of reconciling the old accounts and the new, without burden and without confiscation. In this, as in other matters, it has greatly overestimated the margins of earnings, of solvency and of confidence, to be drawn upon before exhaustion.

The unit system of accruing and segregating the depreciation should be given up, the attempt to create reserves against the past abandoned, and the current reserves made directly available for renewals, replacements and additions. The Interstate Commerce Commission has recently recognized the financial needs of the railroads by granting increases in rates. It cannot consistently impose upon them, at the same time, increase in expenses, depletion of surpluses, and incidental repudiations in reorganization, by a retroactive and confiscatory form of depreciation accounting.

ENGLISH PASSENGERS REQUESTED TO LIMIT AMOUNT OF BAGGAGE.—The Railway Executive Committee has issued an appeal to passengers to refrain from taking an excessive amount of luggage with them. The appeal is based on the grounds that the staff has been considerably depleted.

Norfolk & Western Elkhorn Grade Electrification

Mountain Grades Electrified; Speed of Trains Doubled;
Single Phase Transmission and Three Phase Motors

The electrified section of the Norfolk & Western, known as the Elkhorn Grade, is located on the main line in the southern part of West Virginia, about 105 miles west of Roanoke, and extends from Bluefield to Vivian, a distance of about 30 miles. The section is double track throughout, except in the Elkhorn tunnel, which is single track. There are also a large amount of third track, or passing sidings and branches into the coal workings, and yard trackage. A map of the section is shown in Fig. 1. The grades on the line are heavy, varying from 1 per cent at the west end to 1.5 and 2 per cent up the grade, to and through the summit tunnel, a distance of about ten miles. Thence the line descends on a 2.5 per cent grade for about a mile and then

trains from these sidings on the eastbound trip and the delivery of empties on the return trip. It will thus be seen that the electrified section is practically a local switching and short haul division between the coal fields and Bluefield, operated to a large extent independently of the other traffic of the main division. In addition to the heavy tonnage coal train service, however, through merchandise freight and passenger traffic over the electrified section, which is still handled by steam road engines, is also handled in part by electric engines which are used as pushers or helpers up the grades.

The purpose of the company in electrifying this section is to increase the capacity of the railway by materially reducing the

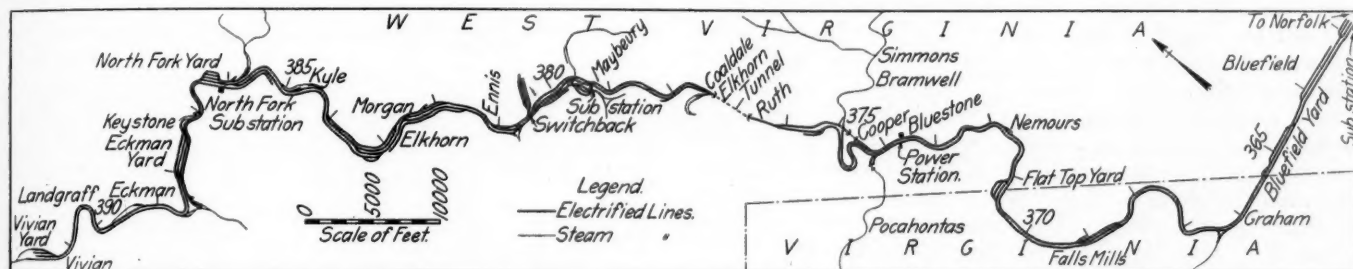


Fig 1—Map of the Elkhorn Grade Electrification of the Norfolk & Western

risers again at the ruling rate of about 0.25 per cent for 10.5 miles, and finally up a 1.22 per cent grade for 3 miles into Bluefield, the easterly end of the division. (See Fig. 2.) Fully 60 per cent of the line is on curves, the maximum being about 12 deg.

The electrification of this section of the railway is primarily for the purpose of collecting from the mine sidings and yards in the coal fields the entire eastbound coal tonnage and transporting it up the grades and over the summit to the classification yard at Bluefield, a division point. From Bluefield, after classification, it is shipped east to the various destination points, chiefly to the

time required to handle trains and to provide a more economical and efficient service over the heavy grades. To this end the heavy freight trains are handled with electric locomotives at a running speed up the grades of 14 m. p. h. as compared with about 7½ m. p. h. under steam operation; and a further saving in time is also effected by the elimination of the delays steam trains have heretofore occasioned by occupying the tracks while the engines take coal and water, one at a time, at the several coal and water stations on the grade. The effect of increased speed is especially marked at the single track Elkhorn tunnel, 3,000 ft. long on a 1.5 per cent grade, where on account of ven-

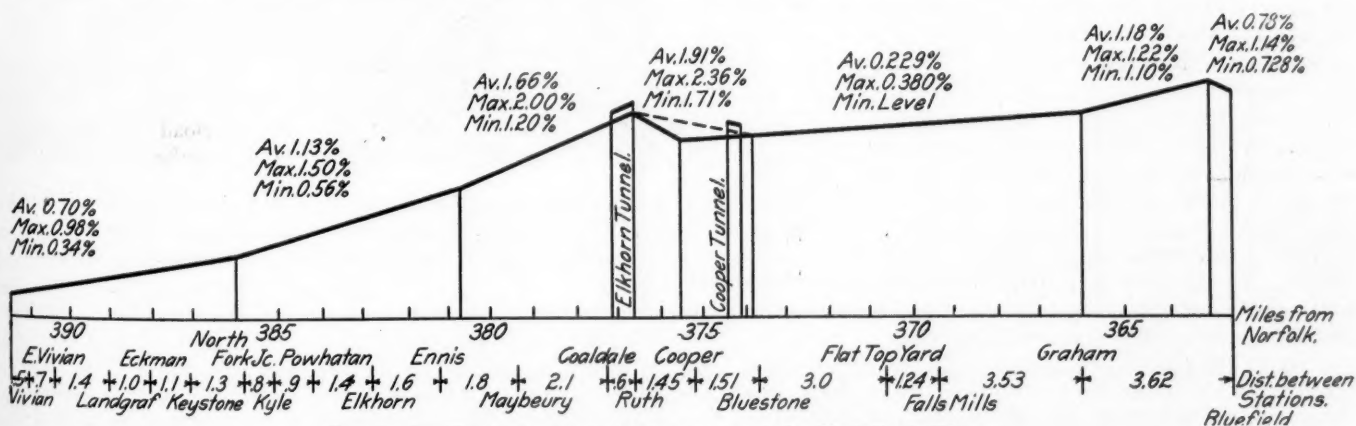


Fig. 2—Profile of the Electrified Section of the Norfolk & Western

Norfolk & Western's marine shipping pier at Lamberts Point, near Norfolk, Va. All coal traffic originates west of Flat Top, about 6 miles east of the summit of the heavy grade, and although much of the coal goes west the easterly shipments are very heavy and this constitutes the chief load handled electrically. Some coal originating east of the summit is shipped to the West, and this is also handled by the electric service to yards near the westerly end of the electrified section.

There are numerous colliery sidings throughout the coal fields, and the electric service includes the collection of loaded cars or

tilation requirements, it has been necessary under steam operation to reduce the speed up grade in the tunnel to about 6 m. p. h. This requires about 7 minutes to clear the block, whereas under electric operation this movement is made in about 3 minutes.

The heavy coal trains, handled in this service, weigh 3,250 tons and have formerly been handled up the grade by three steam locomotives, a road engine and a helper, being used over the entire section, and the third, serving as a pusher up the 1.5 and 2 per cent grades, and being cut off at the summit. These steam engines are of the highly developed heavy Mallet type fitted with

mechanical stokers and superheaters. Under electric operation a single road engine is used over the division and a second electric engine is used as a pusher up the 1.5 and 2 per cent grades. Thus it will be seen that one electric engine takes the place of two Mallets over the division, or two electric engines take the place of three Mallets up the grades and handle the train at approximately double the speed. The speed at which the electric locomotives handle the trains on the 0.4 per cent grade between Cooper and Graham is 28 m. p. h.

Another condition favorable to electric traction is the fact that trains may be despatched at fairly uniform intervals throughout the day, and thus desirable loading conditions on the power system are obtained, and at the same time the full service is handled with a moderate number of locomotives, each making a number of round trips per day.

The electrical installation has been laid out and power plant, locomotives and other equipment provided for handling 20 tonnage trains, or 65,000 tons, a day eastbound over the division and ample provisions have been made for additional traffic and extensions when required. The number of these tonnage trains handled per day at present is about 12, in addition to which pusher and helper service is provided for through freight and passenger trains.

The single-phase system of traction is used, power being generated, transmitted and distributed single phase at 25 cycles and collected from the overhead catenary trolley contact system at 11,000 volts. The locomotives, however, are unique in that they are equipped with phase converters, which, in connection with the main step-down transformers on the locomotive, transform the single-phase power of the trolley to three-phase power for use in the three-phase induction type traction motors. Thus, while retaining all the advantages of high voltage single-phase distribution and collection, the advantages of three-phase induction motors for these heavy traction mountain grade conditions are also secured.

Another characteristic feature of the installation is the fact that as the result of the use of traction motors of the poly-phase induction type it is feasible without the use of additional or complicated apparatus and devices to utilize the locomotives for electrically holding or braking the trains at constant speed while descending grades. This utilizes the energy in the moving train descending the grade to drive the motors as generators and thus return energy to the line. On the Elkhorn Grade the conditions are such that the full advantages of this form of braking can be secured in that the trains are very heavy, the grades are severe, and the speeds are relatively high. The performance of this feature of the installation has proven highly satisfactory under operating conditions, the heaviest trains being handled down the mountain grades with a single engine at a uniform speed of about 15 m. p. h. with ease, the air brakes being held in reserve for bringing the train to a standstill when required. This results in a large reduction in the wear on brake shoes and wheel tires and wear and tear on draft gear and on the cars and locomotives generally.

Next to the electric locomotives, the most interesting feature of the electrification is probably the catenary line construction. In designing this feature of the installation, the engineers had uppermost in mind the two important requirements of reliability of service and low cost of maintenance. An effort has been made to secure the maximum degree of flexibility and freedom from hard spots at the contact wire so as to avoid rapid deterioration and frequent breakages and failures, and a special effort has also been made to provide the highest type of insulation so as to avoid interruptions to service due to insulation breakdowns.

In designing the supporting structures an effort has been made to secure a neat and attractive appearing structure which would not interfere with the view of signals and which would present the least surface for corrosion and

minimize the cost of painting and repairs as well as the first cost of installation. In working out the design on these lines, the catenary system has taken the form of the single catenary with an auxiliary messenger wire above the trolley, one main hanger being provided for every two intermediate connections between the auxiliary and trolley on tangents. On curves the angularity of the hangers provided the necessary flexibility, the auxiliary messenger and trolley wire being connected to the hanger at the same point.

The principle of providing more than one single insulator between the live parts and ground has been adopted and suspension insulators are used throughout as being the least liable to fail due to transverse stresses. For the main line tracks three suspension insulators are connected in series so that the failure of one or even two at any point will not result in the complete breakdown of the insulation and interrupt the service. For the yard tracks and sidings two such insulators are used. Great care has been taken also to provide ample clearance between every live part and adjacent grounded structures and as a rule this clearance is maintained at not less than 18 in. so as to avoid the

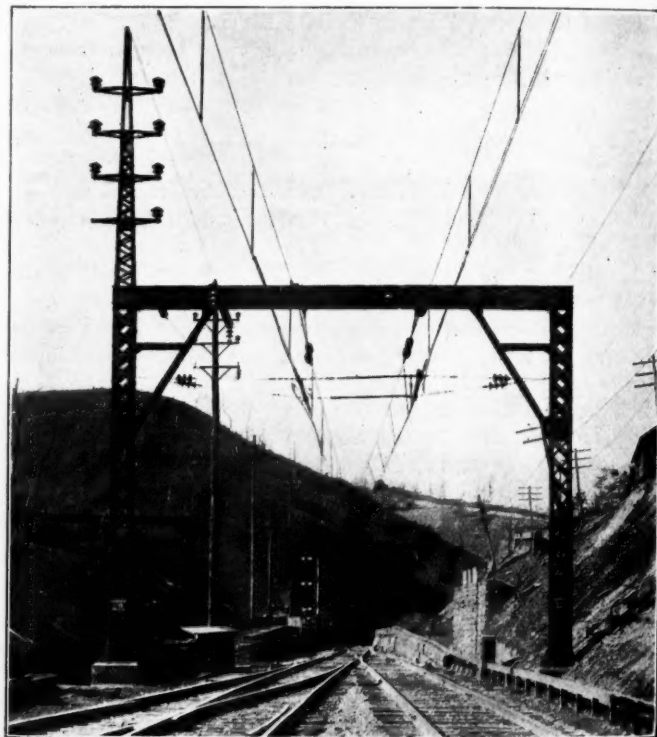


Fig. 3—Self Supporting Bridge at East Portal of Elkhorn Tunnel. Note the Section Break in the Contact Line, the Crossover and Wood Pole Transmission Line Over the Mountains to the Left

danger of birds or foreign materials causing a short circuit. The same principle applies in the tunnels; the insulators are, however, placed off to the side and out of the direct blast from locomotive stacks and here two 44,000 volt transmission line insulators in series are used in all cases between live points and ground.

In laying out the electrical installation a great deal of attention has been given to the provision of adequate and convenient facilities for the inspection and maintenance of all parts of the installation. The center and headquarters of the whole system is at Bluestone, where the power house is necessarily located on account of the water supply. After much study it was decided to locate the inspection building and machine shop for maintenance of electric locomotives here also rather than to try to take care of electric engines at the steam engine shops at Bluefield. The headquarters of the line maintenance force are also located at Bluestone

and are in constant touch, by means of a patrol telephone line and telephone placed at signal bridges, in addition to the usual telephone facilities, with all parts of the electrified section. The company has also provided dwellings for foremen and others on its property near the power house at Bluestone.

In addition to the direct advantages and savings resulting from the electric train service the railway has taken advantage of the presence of an adequate power supply at net cost of generation for the operation of various auxiliary plants. Thus a large steam pumping station at Bluestone for the water supply for steam locomotives has been shut down and the pumping is done at the electric power station located nearby, and the fans for ventilating the Elkhorn Tunnel will now be driven by electric motors. Likewise

ports, except at the tunnels, where the line goes above ground over the summits. The method of support is clearly shown in Fig. 3. There are two single-phase lines between the power house and substations. These consist of four No. 2/0-seven strand hard drawn copper wires. A $\frac{3}{8}$ in. steel ground wire is carried on the poles for the length of the line. The high tension insulators are of the four petticoat pin type with a maximum diameter of 12 in. and are tested at 165,000 and 120,000 volts respectively, for dry and wet flashover; their ultimate mechanical strength is about 4,000 lb., applied at right angles to the pin at the wire groove.

The wood poles of the lines over the tunnel summits are of chestnut and vary from 45 ft. to 55 ft. in length. At present they carry three arms each with provision for a

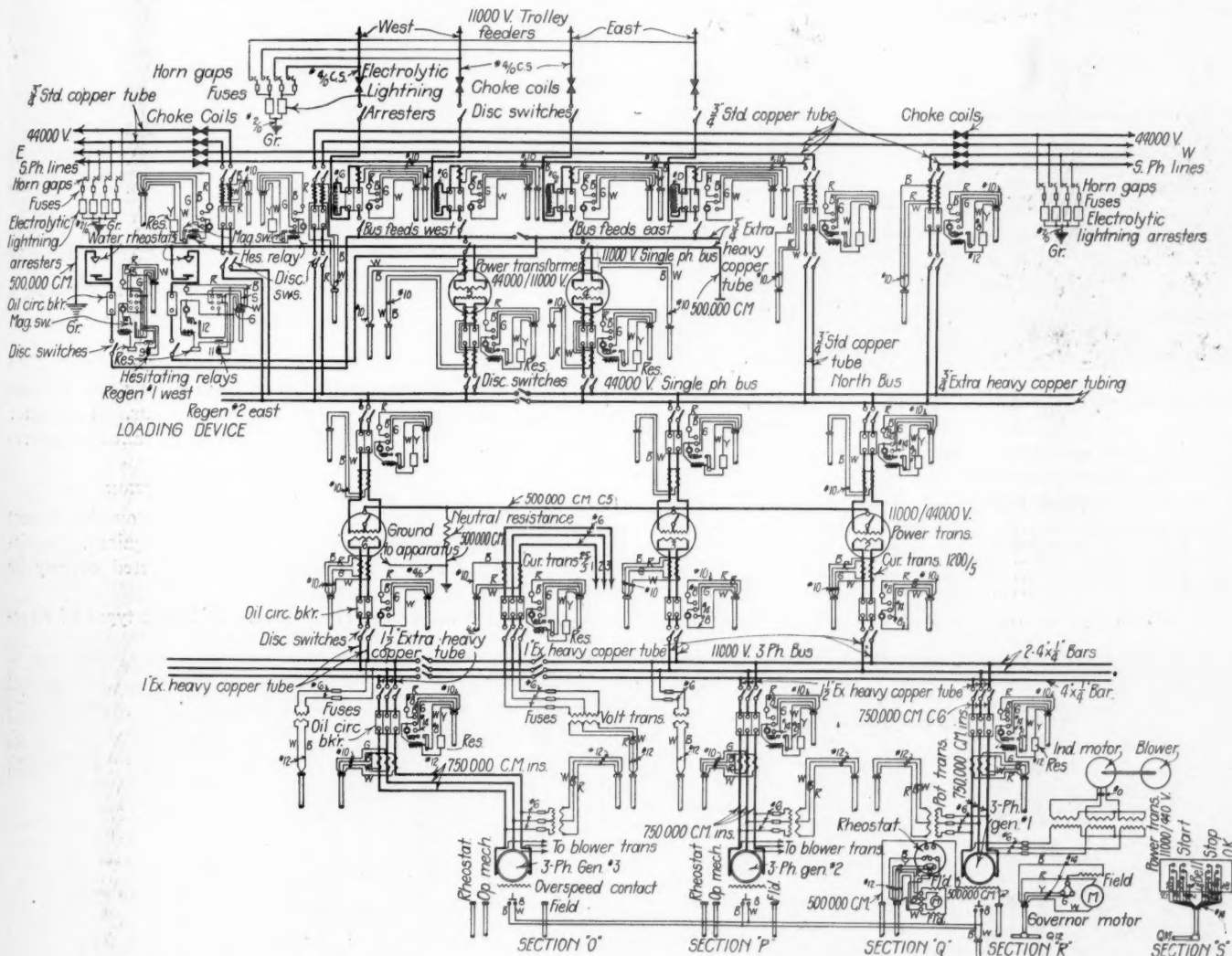


Fig. 4—Diagram of General Connections Between Power House and the Principal Substation Apparatus

electric power will also be ultimately used for operating shops and pumps at Bluefield and several other points on the division.

The electrification of this section had long been under consideration, but the decision to electrify was not reached until about two years ago. The layout and design of the entire installation was worked out in all details by Gibbs & Hill, engineers for the company. All construction, excepting the power house and inspection buildings and some of the power station equipment, was carried out by a specially organized railroad force under the supervision of the engineers.

TRANSMISSION

High tension power is transmitted at 44,000 volts, 25 cycles, single phase. The wires are carried on the catenary sup-

ports. The two upper cross arms carry the 44,000 volt wires and the lower arms the 4,400 volt signal wires. An 11,000 volt trolley feeder is carried over the Elkhorn Tunnel Summit. The cross arms on all poles are connected to the ground wire which is grounded by means of a copper cable which terminates in a copper plate bedded in the earth at the base of every fourth pole. The high tension lines are sectionalized at each substation by means of air break switches on steel structures on the roof.

SUBSTATIONS

All power supplied to the trolley system and trains is obtained from transformers which step down the voltage from 44,000 to 11,000 volts. These are housed in suitable buildings. One of the substations is located in the transformer and switching house at the power station. On ac-

mechanical stokers and superheaters. Under electric operation a single road engine is used over the division and a second electric engine is used as a pusher up the 1.5 and 2 per cent grades. Thus it will be seen that one electric engine takes the place of two Mallets over the division, or two electric engines take the place of three Mallets up the grades and handle the train at approximately double the speed. The speed at which the electric locomotives handle the trains on the 0.4 per cent grade between Cooper and Graham is 28 m. p. h.

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The electrical installation has been laid out and power plant, locomotives and other equipment provided for handling 20 tonnage trains, or 65,000 tons, a day eastbound over the division and ample provisions have been made for additional traffic and extensions when required. The number of these tonnage trains handled per day at present is about 12, in addition to which pusher and helper service is provided for through freight and passenger trains.

The single-phase system of traction is used, power being generated, transmitted and distributed single phase at 25 cycles and collected from the overhead catenary trolley contact system at 11,000 volts. The locomotives, however, are unique in that they are equipped with phase converters, which, in connection with the main step-down transformers on the locomotive, transform the single-phase power of the trolley to three-phase power for use in the three-phase induction type traction motors. Thus, while retaining all the advantages of high voltage single-phase distribution and collection, the advantages of three-phase induction motors for these heavy traction mountain grade conditions are also secured.

Another characteristic feature of the installation is the fact that as the result of the use of traction motors of the poly-phase induction type it is feasible without the use of additional or complicated apparatus and devices to utilize the locomotives for electrically holding or braking the trains at constant speed while descending grades. This utilizes the energy in the moving train descending the grade to drive the motors as generators and thus return energy to the line. On the Elkhorn Grade the conditions are such that the full advantages of this form of braking can be secured in that the trains are very heavy, the grades are severe, and the speeds are relatively high. The performance of this feature of the installation has proven highly satisfactory under operating conditions, the heaviest trains being handled down the mountain grades with a single engine at a uniform speed of about 15 m. p. h. with ease, the air brakes being held in reserve for bringing the train to a standstill when required. This results in a large reduction in the wear on brake shoes and wheel tires and wear and tear on draft gear and on the cars and locomotives generally.

Next to the electric locomotives, the most interesting feature of the electrification is probably the catenary line construction. In designing this feature of the installation, the engineers had uppermost in mind the two important requirements of reliability of service and low cost of maintenance. An effort has been made to secure the maximum degree of flexibility and freedom from hard spots at the contact wire so as to avoid rapid deterioration and frequent breakages and failures, and a special effort has also been made to provide the highest type of insulation so as to avoid interruptions to service due to insulation breakdowns.

In designing the supporting structures an effort has been made to secure a neat and attractive appearing structure which would not interfere with the view of signals and which would present the least surface for corrosion and

minimize the cost of painting and repairs as well as the first cost of installation. In working out the design on these lines, the catenary system has taken the form of the single catenary with an auxiliary messenger wire above the trolley, one main hanger being provided for every two intermediate connections between the auxiliary and trolley on tangents. On curves the angularity of the hangers provided the necessary flexibility, the auxiliary messenger and trolley wire being connected to the hanger at the same point.

The principle of providing more than one single insulator between the live parts and ground has been adopted and suspension insulators are used throughout as being the least liable to fail due to transverse stresses. For the main line tracks three suspension insulators are connected in series so that the failure of one or even two at any point will not result in the complete breakdown of the insulation and interrupt the service. For the yard tracks and sidings two such insulators are used. Great care has been taken also to provide ample clearance between every live part and adjacent grounded structures and as a rule this clearance is maintained at not less than 18 in. so as to avoid the

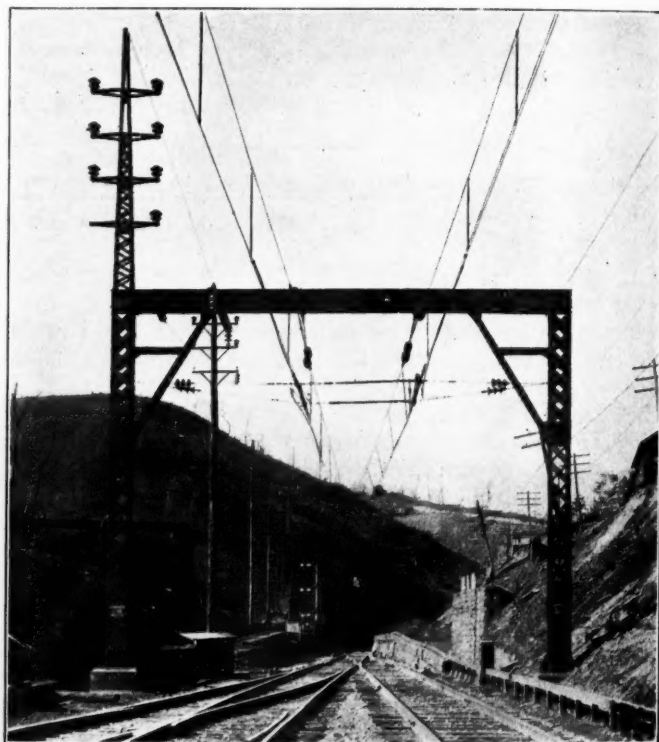


Fig. 3—Self Supporting Bridge at East Portal of Elkhorn Tunnel. Note the Section Break in the Contact Line, the Crossover and Wood Pole Transmission Line Over the Mountains to the Left

danger of birds or foreign materials causing a short circuit. The same principle applies in the tunnels; the insulators are, however, placed off to the side and out of the direct blast from locomotive stacks and here two 44,000 volt transmission line insulators in series are used in all cases between live points and ground.

In laying out the electrical installation a great deal of attention has been given to the provision of adequate and convenient facilities for the inspection and maintenance of all parts of the installation. The center and headquarters of the whole system is at Bluestone, where the power house is necessarily located on account of the water supply. After much study it was decided to locate the inspection building and machine shop for maintenance of electric locomotives here also rather than to try to take care of electric engines at the steam engine shops at Bluefield. The headquarters of the line maintenance force are also located at Bluestone

and are in constant touch, by means of a patrol telephone line and telephone placed at signal bridges, in addition to the usual telephone facilities, with all parts of the electrified section. The company has also provided dwellings for foremen and others on its property near the power house at Bluestone.

In addition to the direct advantages and savings resulting from the electric train service the railway has taken advantage of the presence of an adequate power supply at net cost of generation for the operation of various auxiliary plants. Thus a large steam pumping station at Bluestone for the water supply for steam locomotives has been shut down and the pumping is done at the electric power station located nearby, and the fans for ventilating the Elkhorn Tunnel will now be driven by electric motors. Likewise

ports, except at the tunnels, where the line goes above ground over the summits. The method of support is clearly shown in Fig. 3. There are two single-phase lines between the power house and substations. These consist of four No. 2/0-seven strand hard drawn copper wires. A $\frac{3}{8}$ in. steel ground wire is carried on the poles for the length of the line. The high tension insulators are of the four petticoat pin type with a maximum diameter of 12 in. and are tested at 165,000 and 120,000 volts respectively, for dry and wet flashover; their ultimate mechanical strength is about 4,000 lb., applied at right angles to the pin at the wire groove.

The wood poles of the lines over the tunnel summits are of chestnut and vary from 45 ft. to 55 ft. in length. At present they carry three arms each with provision for a

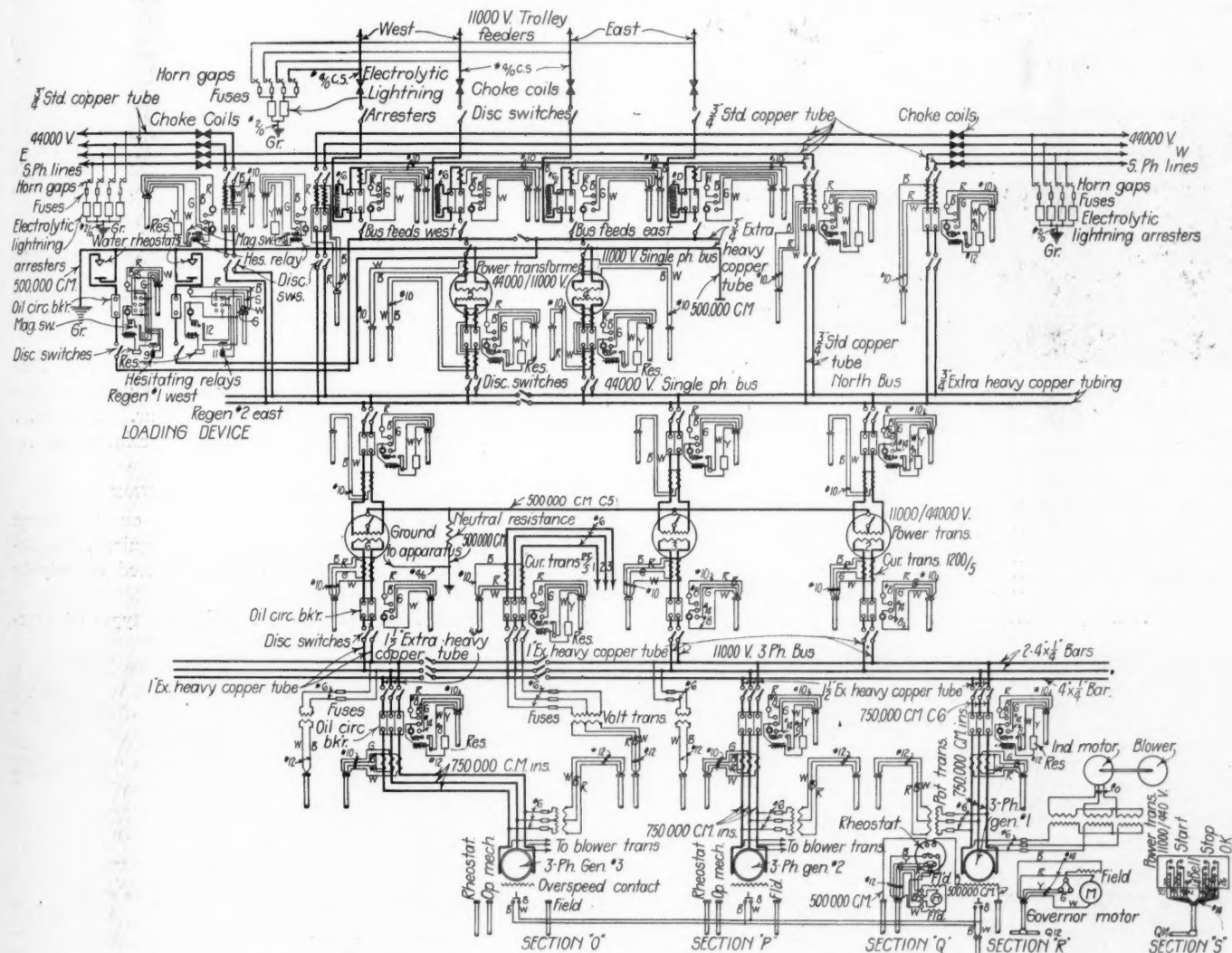


Fig. 4—Diagram of General Connections Between Power House and the Principal Substation Apparatus

electric power will also be ultimately used for operating shops and pumps at Bluefield and several other points on the division.

The electrification of this section had long been under consideration, but the decision to electrify was not reached until about two years ago. The layout and design of the entire installation was worked out in all details by Gibbs & Hill, engineers for the company. All construction, excepting the power house and inspection buildings and some of the power station equipment, was carried out by a specially organized railroad force under the supervision of the engineers.

TRANSMISSION

High tension power is transmitted at 44,000 volts, 25 cycles, single phase. The wires are carried on the catenary sup-

ports. The two upper cross arms carry the 44,000 volt wires and the lower arms the 4,400 volt signal wires. An 11,000 volt trolley feeder is carried over the Elkhorn Tunnel Summit. The cross arms on all poles are connected to the ground wire which is grounded by means of a copper cable which terminates in a copper plate bedded in the earth at the base of every fourth pole. The high tension lines are sectionalized at each substation by means of air break switches on steel structures on the roof.

SUBSTATIONS

All power supplied to the trolley system and trains is obtained from transformers which step down the voltage from 44,000 to 11,000 volts. These are housed in suitable buildings. One of the substations is located in the transformer and switching house at the power station. On ac-

count of objectionable conditions which would result from short circuits it was decided not to feed the nearby sections of trolley lines directly from the power house generator bus. Fig. 4 shows the general connections with the principal substation apparatus. The buildings are all of the same type, similar to the Maybeury station shown in Fig. 5.

The oil circuit breakers in the substations are remote-controlled and will be operated from adjacent signal towers or passenger stations, or at the yard master's offices, thus requiring no attendance. Power at 440 volts for the operation of the oil circuit breakers is obtained from two step-

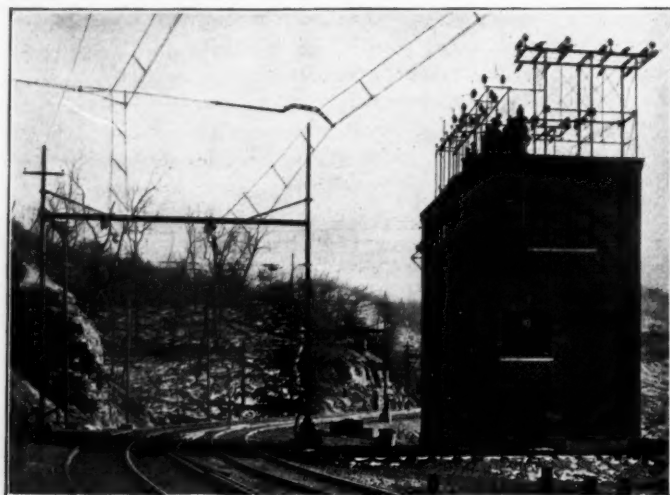


Fig. 5—Maybeury Substation—Norfolk & Western Electrification

down transformers, one connected to the 11,000 volt bus and one to the 440,000 volt bus.

The equipment of substations is as follows:

Bluefield	2—3,000 k. v. a. units	6,000 k. v. a.
Bluestone (power house)	2—2,000 k. v. a. units	4,000 k. v. a.
Maybeury	2—5,000 k. v. a. units	10,000 k. v. a.
North Fork	2—3,000 k. v. a. units	6,000 k. v. a.
Vivian	1—2,000 k. v. a. unit	2,000 k. v. a.
Total capacity		28,000 k. v. a.

The transformers are of the Westinghouse single-phase, oil-insulated, water-cooled type with primaries wound for 44,000 volts and secondaries for 11,000 volts. They are equipped with thermostats which at high temperatures close

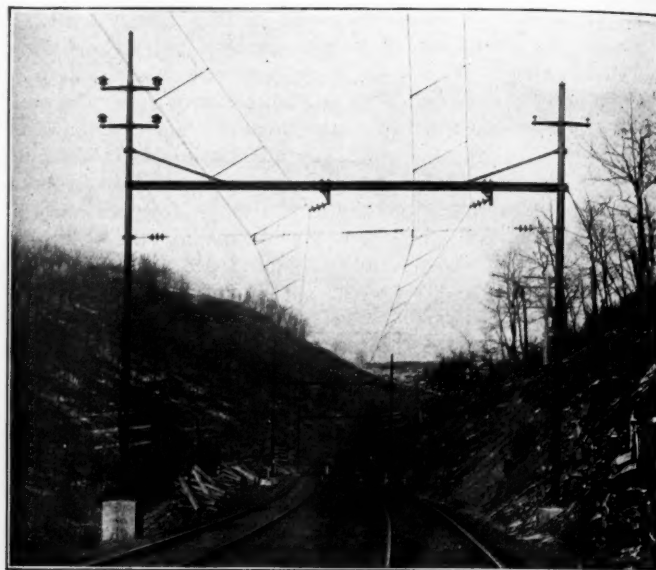


Fig. 6—Tubular Pole Construction at Transition Point, Showing a Typical Curve on the Main Line

a bell alarm circuit to the nearest operator's office. Two transformer oil filter outfits have been provided—one for the power house and one for the substations. The latter outfit is transferred from one substation to another as required.

DISTRIBUTION AND CATENARY CONSTRUCTION

One advantage of using a very high voltage on the contact system is that no supplementary feeders are required, the distribution of power from substations being effected entirely by means of the trolley lines proper.

Supporting Structures.—There are two distinct types of struc-

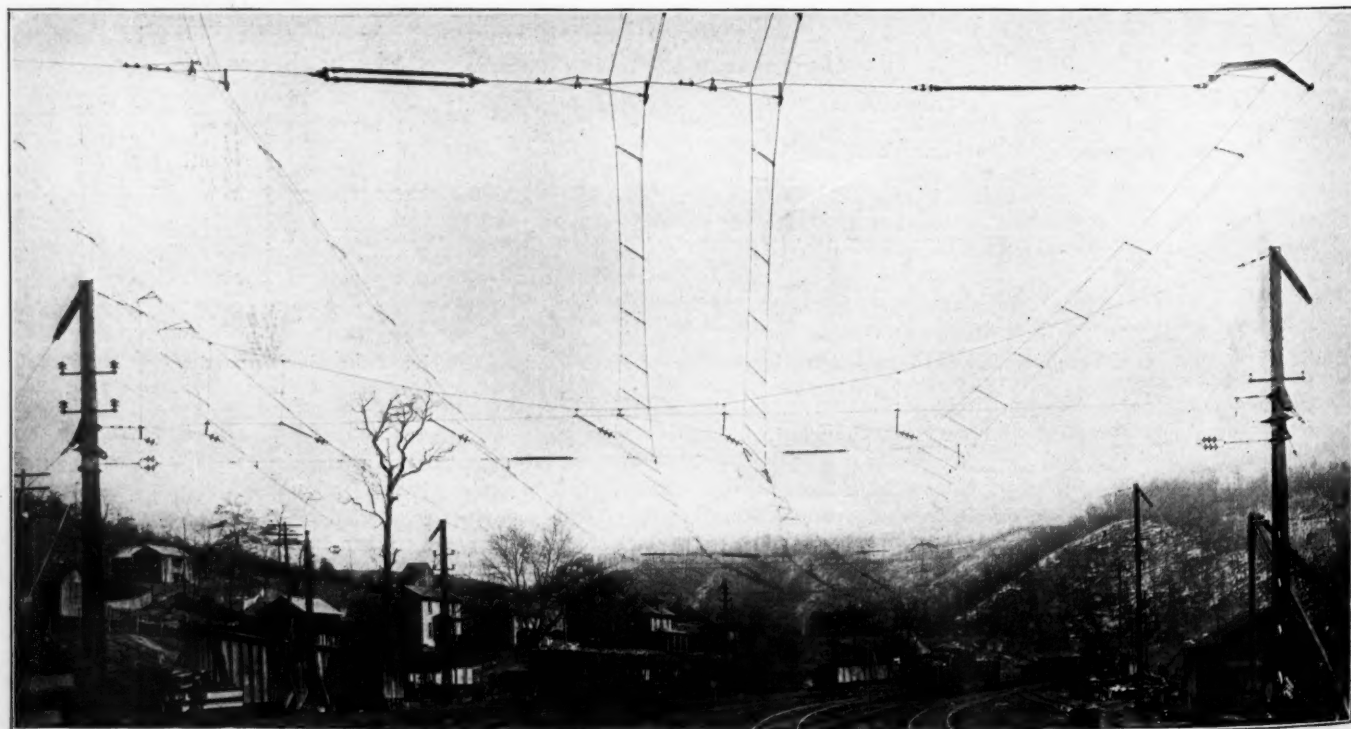


Fig. 7—Cross Catenary Construction Used in the Yards of the Norfolk & Western at Flat Top—Notice the Small Amount of Obstruction Offered by This Type of Construction

tures used for supporting the system of catenary or trolley lines; one, which is used on the main line, where the wires are suspended from overhead beams or girders and the other, used in yards, where an overhead cross-catenary cable is used to support the longitudinal catenary wires of a large number of tracks. Fig. 6 shows a typical main line structure. It consists of two tubular steel poles set in concrete foundations and carrying between them a structural H-beam. The beam being partially supported by means of sag braces up to the poles. The poles extend above the crossbeam and sag braces and support cross arms which carry the high tension feeders and the signal feeders. The protecting ground wires are clamped to castings



Fig. 8—Norfolk & Western Electric Locomotives Hauling a Tonnage Train

screwed on the top of the poles. The structure as a whole is unguyed if on tangent track, but on curved track is guyed against the curve pull of the catenary system.

The catenary supporting structures are nominally 300 ft. apart on tangent track and somewhat closer together on curves, depending on the degree of curvature and whether or not intermediate pulloff poles are used between adjacent supporting structures. The foundations are of 1:2:5 concrete, reinforced

of 20 deg. with the pole. While the above describes the normal main line structure, there are many variations, including bridges having both structural posts and girders which are used where the structures carry signals as well as the catenary system; similar though lighter structural bridges are used on curved track where property for guy anchors is not available.

In the yards the catenary carrying structures consist of two or more high structural steel posts or columns, guyed or self-supporting depending on the location and available property. From the top of one post a cross-catenary cable of extra high tension galvanized steel strand is run across the tracks to the top of the opposite post. In many instances this is $1\frac{1}{2}$ in. cable, having a breaking strength of about 240,000 lb. It is designed to have a large sag which, where the yard is several tracks wide, necessitates high posts. A second strand of steel cable is carried horizontally from post to post, below and suspended from the top cross-catenary cable with $\frac{3}{4}$ in. rods. Fig. 7, showing a view in the Flat Top yard, is typical of this yard type of construction. The steel structures other than tubular poles were fabricated by the Virginia Bridge Company.

The Catenary System.—The appearance of the catenary system is so simple that one has to actually build it before appreciating the many problems and difficulties that surround its design and construction. The object in the present case is to hold a 3/0 grooved phono-electric contact or trolley wire at a uniform height of 24 ft. above the top of the rails in such a location that it will not vary horizontally more than 12 in. from the center of the rails (allowing for superelevation) and that the bottom of the wire will present an unbroken level surface on which the pantograph shoe will ride smoothly.

Over tangent tracks the construction is simple. From each of the supporting structures a steel casting attached to the horizontal beam or girder serves as a support for three suspension type insulators. Each of these three insulators is of itself good for a working voltage of 11,000 volts and three are used as a special insurance against line troubles. Since the initial energizing of the line about the middle of December, there has not been a single failure of any of these strings of insulators. To the bottom insulator is attached a malleable iron casting which supports and clamps the messenger wire. This casting has ample

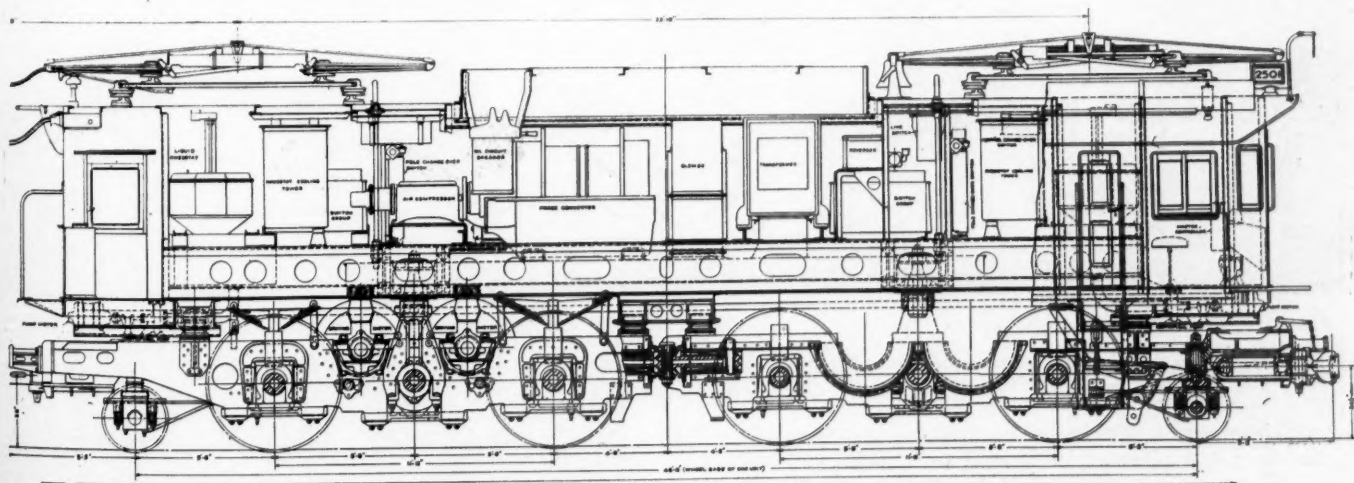


Fig. 9—Section of Norfolk & Western Electric Locomotive

with rods, and cored with a collapsible form. A copper ground plate is set in coke underneath one of the two foundations and a substantial copper cable carried up through the concrete for later attachment to the pole with an expanded pin type bond terminal. The steel poles are built up of various lengths, sizes and weights of steel pipe swedged together.

The guys are of very substantial construction and are relied upon to carry a material portion of the load. The guy anchors are made of concrete slabs containing two or more pieces of old rail. Double guys are used, the two rods making an angle

bearing for the wire and arcing horns so that should an insulator fail the arc will probably be from the casting instead of the wire.

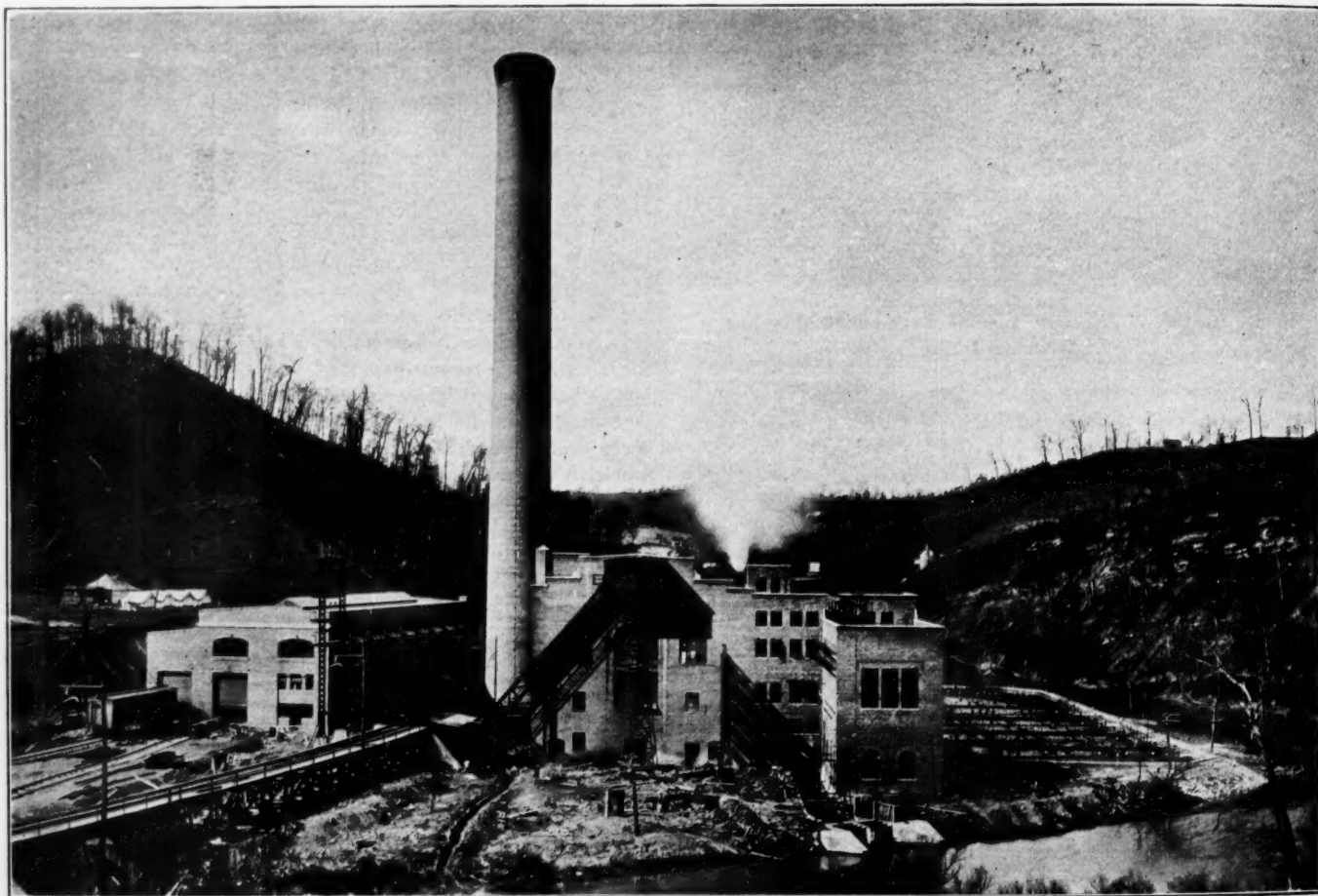
The messenger wire is $\frac{1}{2}$ in. extra high tension galvanized steel stranded cable having a breaking strength of over 30,000 lb. The nominal sag in the messenger wire is 5 ft. in a 300 ft. span, the actual sag, of course, depending upon the particular span. Spaced 30 ft. apart along the messenger wire are bent strap clips which hold the hanger straps. To the bottom of the hangers is bolted a pair of malleable iron trolley clips which, however, on tangent track do not grip the contact or trolley wire

but hold an auxiliary messenger wire. This auxiliary messenger wire is a No. 0 round copper or steel wire depending on whether the load conditions require the added carrying capacity of copper over steel. From the auxiliary messenger wire the 000 grooved contact or trolley wire is supported by a pair of clips bolted together and spaced 15 ft. apart, but so spaced that they are equidistant from the hangers holding up the auxiliary messenger wire. The result is an extremely flexible or "smooth" running trolley. All calculations are made for an average temperature of 60 deg.

Steady strands hold the trolley wires in place crosswise to the tracks where this is found necessary in the longer tangent stretches. All such steady strands are insulated from ground by a string of three suspension type insulators and where one of these cross steady strands from pole to pole of structure attaches to the wires over two or more tracks, it is sectionalized between the tracks by an impregnated wood stick insulator 4 ft.

At certain locations the catenary system is anchored longitudinally or dead ended by being solidly attached to the cross girders of special structural bridges provided for that purpose, the messenger being insulated from the bridge by the double string of three insulators. Such anchors are to limit the zone of trouble should a wreck or other unforeseen accident break a messenger wire. The normal messenger wire support at the bottom of the strings of insulators is so designed that at a certain pull the messenger will slip through. Hence should a messenger break between anchors it is expected it will slip through several supports adjacent to the break and thus distribute the abnormal strain over several bridges instead of the strain coming all on the two structures at each side of the break.

The above while particularly describing main line tangent track construction applies in large measure to all the catenary system. Where the track is curved, as it is in the larger portion of the work, the system has been designed within limits such that the



The extension or wing at the right end of the power house is a substation and the structures for carrying the outgoing feeders are shown.
Fig. 10—General View of Power House from the West, Showing the Inspection Building to the Left, Intake Canal and Cooling Pond to the Right

long. The trolley is sectionalized longitudinally where necessary by breaking the messenger wire with two strings in parallel of three insulators each. Directly below this electrical break in the messenger wire the auxiliary messenger and contact wires are attached with turnbuckles to the ends of a heavy impregnated wood stick insulator. Tee iron runners are supported from the trolley wires and from the wood stick insulator, the runners, being supported at opposite ends and sides of the insulators, have ample electrical clearance from each other. At those section breaks which are provided to permit isolation of parts of the line for repairs, but which are normally connected through electrically, specially designed disconnecting knife switches are mounted on top of the wood section break insulators. These can be opened or closed from the ground by means of a long impregnated wooden switch stick.

contact wire may be 12 in. off the center line of track in one direction at the bridges or points of support and 6 in. off the center line of track in the other direction at the center of the span. This allows the trolley curvature to be less than the track curvature. In speaking of center of track and departure of trolley wire, therefore, what is really meant is the loci of the middle point on the pantagraph shoe.

The hangers on curves are 15 ft. apart and the clips at the bottom hold both the auxiliary messenger and the contact or trolley wire. This is essential since unless held vertically below the auxiliary messenger by resistance to bending in the clips and the hangers, the curve pull of the contact wire would pull it up to the same level as the auxiliary messenger. This holding of both wires by the same clips at the ends of the hangers does not, however, result in "hard spots" in the trolley. In this district

most of the track is curved and a large portion of it is a relatively high degree of curvature running to a maximum of 12 deg. In order to avoid an uneconomically close spacing of structures on the high track curves one and sometimes two pull-off poles are used between bridges.

In the yards the catenary system is, of course, very similar to that on the main line except that the messenger insulators are

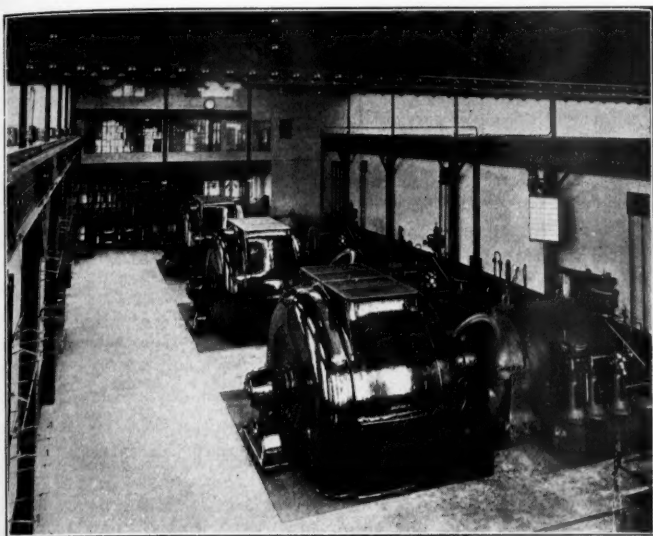


Fig. 11—View of Turbine Room from the West End Showing the Main Generating Units. The Operating Gallery is on a Level with Crane Track

supported from the lower or horizontal wire strand of the cross-catenary bridge. In yards only two of the suspension type insulators are used between live wires and grounded structures and the auxiliary messenger wire is omitted, the clips at the end of the hanger straps holding the contact wire in tangent as well as in curved construction.

In the Elkhorn Tunnel special catenary construction was necessary. This is a single track tunnel, 3,000 ft. long, the walls

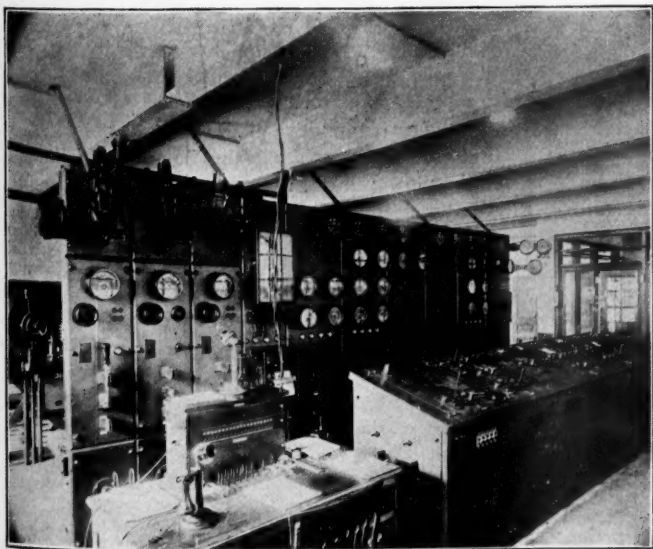


Fig. 12—Control Boards in the Operating Gallery of the Power House

are 14 ft. apart at the spring line and 13 ft. apart at the base, the spring line is 11 ft. 1 in. above the top of the rails, while the top of the arch is 19 ft. 3 in. high. The arrangement adopted was to have a supporting structure every 75 ft. apart. At each side of each structure two cast iron brackets held to the brick lining of the tunnel by large bronze expansion bolts, each carry a 44,000

volt transmission line insulator. A 2 in. brass pipe is carried parallel to the tracks by the pair of insulators on each side. Another line insulator on each side is mounted by bronze castings at the middle of these pipes and a cross pipe bent to follow the arch of the tunnel, forms the support for a bronze messenger wire. The live catenary parts have, therefore, double 44,000 volt insulation to ground. Despite the necessarily very limited clearances, the work in this tunnel stood a test of three times normal trolley voltage and has so far performed very satisfactorily for the several weeks it has been in service. Fig. 3 shows the east portal of this tunnel in which the contact wire is 17 ft. 3 in. above the rails.

On branches and coal mine sidings, the wooden pole bracket type of construction is used. In such places, only two of the suspension type insulators are used. The messenger wire is $\frac{3}{8}$ in. steel strand and the contact wire No. 2/0, no auxiliary messenger being used.

Track Bonds.—A special type of track bond has been designed for this installation. By manufacturing the bonds with only one terminal attached and crimping or looping the cable near one end, the bond may be installed by removing only one bolt in the fish plate. In this way these bonds may be installed almost as

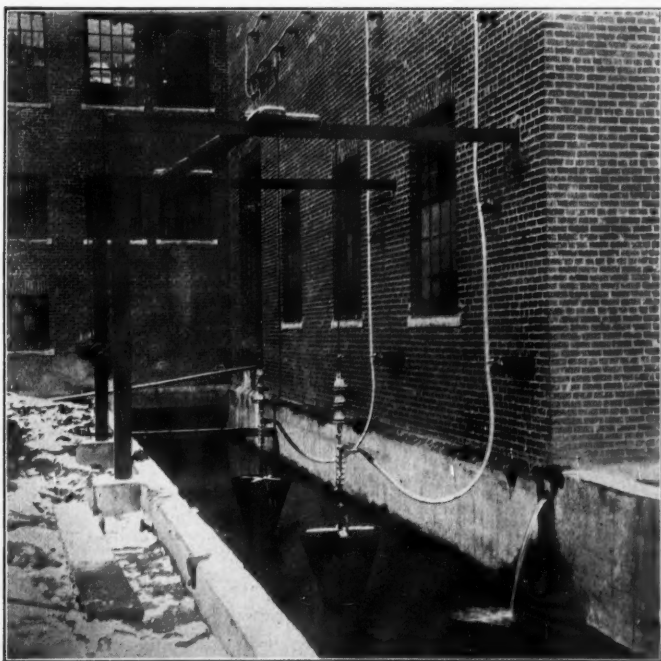


Fig. 13—Water Rheostats for Absorbing Excess Regenerated Power

quickly as the exposed type while retaining all the advantages of the concealed type. The cable consists of 37 strands of 0.0534-0.475-in. copper wire. At signal bridges the rail joints are insulated and it is necessary to install bonds so that the flow of propulsion current shall be continuous. This result is accomplished by the use of impedance bonds which prevent the flow of 60-cycle signal current from getting past the insulated joint, but at the same time do not interfere with the flow of 25-cycle propulsion current.

Protection of Telephone and Telegraph Lines.—In order to protect the telephone and telegraph lines along the railway from danger of interruption of the service due to the electrical installation, it was necessary to make certain provisions, first, against the hazard of physical contact between falling telegraph wires and high tension power wires, and, second, against induction set up in parallel telephone and telegraph lines due to current flowing in the power circuits. It was found preferable to move the telephone and telegraph lines entirely to the north side of the tracks and locate them at the extreme edge of the right-of-way so as to be as far as possible from the power circuits. The nearest 11,000 volt traction power wire to the telephone and

telegraph circuits is the trolley over the northerly or westbound track.

To provide against induction it was decided to place the main transformer substations somewhat closer together than would be required by considerations of voltage regulation and losses and to place the end substations near the ends of the line. This results in feeding each important or long section of trolley from both ends and consequently the induced voltage in parallel telephone and telegraph lines is largely localized and neutralized. In addition to this, however, in order to provide for emergency conditions when one substation may be out of service and for excessively high currents which occur in cases of short circuits and grounds, it was decided to install so-called track transformers or boosters in the trolley and track circuit at intervals of about one mile. The purpose of these transformers is to cause the return current, a considerable amount of which would ordinarily leak to earth, to flow in the track rails and thus keep it at a fixed distance from the trolley wire and the telephone and telegraph wires. There are two sets of coils wound on the core of each transformer, one for the eastbound and the other for the westbound track, hence only one transformer is required at each point. By the use of a combination of all of the above appliances and devices it is found that the telephone and telegraph service is not interfered with by the operation of the electric train service.

LOCOMOTIVES

The traffic on the electrified section is handled by twelve 270-ton Baldwin-Westinghouse locomotives, each consisting of two 135-ton units or halves (see Figs. 8 and 9). It is necessary in handling heavy trains on mountain grades to have a part of the motive power at the rear of the train. In this case the power is divided equally between the two ends of the train and the trains are of such length in this mountainous country that there is difficulty of transmitting the starting and stopping signals from one locomotive to the other and thus the locomotives are subject to treatment which would be considered impossible in ordinary service. This would require very careful handling with the ordinary locomotive, but these locomotives are designed to meet these severe requirements of the service without involving special manipulation. In meeting these conditions the rugged construction of the three-phase induction motor, being free from commutators, and the liquid rheostat are of the greatest importance. The liquid rheostat not only gives the smoothest possible gradations of tractive effort, but the latent heat of steam makes it possible without difficulty to dissipate the large amount of heat generated in the rheostat in meeting this severe requirement. The inherent characteristics of the induction motor which enable the locomotive to automatically hold the train at a constant speed on descending grades by regenerating and returning power to the line, also accentuate the advantages of this type of locomotive.

The locomotive units have a 2-4-4-2 wheel arrangement, the two trucks being connected by a hinge joint. The cab is of the box type and is supported on the main truck entirely by spring cushioned friction plates, there being no weight on the center pins, which serve only to maintain the cab in its proper position on the trucks. An engineer's compartment is provided at one end of each unit, the two units being so coupled as to provide for operation from either end of the locomotive.

Each locomotive is equipped with eight traction motors of the 3-phase induction type, with wound secondaries for 4 pole and 8 pole operation. The motors are forced cooled by air from the main ventilating duct, which also delivers air to the phase converter and to cooling towers for the liquid rheostats. There are two running speeds, 14 and 28 m. p. h. In starting, resistance is inserted in the secondary circuit of the motor by means of a liquid rheostat. For the 14 m. p. h. speed all motors are connected in parallel, having the eight pole motor combination and for the 28 m. p. h. speed they are also connected in parallel, but with the four pole motor combination. The locomotives are equipped with unit switch type of control and arranged for the

simultaneous operation of the two units from the control end of either.

The control equipment is built for handling alternating current, which is collected from the 11,000 volt line by the pantagraph trolleys. This current is fed to the main transformers through an oil type circuit breaker. A phase converter is connected to the low tension side of the transformer and operates constantly when the locomotive is in service. To its extended shaft are coupled a blower for cooling the motors, transformers and other parts, and, through a clutch the air compressor. The converter is an induction motor with a short circuited or cage wound secondary having two windings on its stator, one to drive the rotor and the other to furnish current out of phase with the main supply current.

The motor circuit of the primary winding of this converter is connected across the secondary of the locomotive transformer and receives current at 725 volts. The arrangement of windings is such that with the converter running, a current of 90 deg. phase displacement is induced in the second winding on the primary of the converter. By connecting this displacement circuit to the middle tap of the main transformer, a three phase current is produced. It is only necessary to convert a portion of the current used in the main motors as a large portion comes directly from the main transformers. For starting the converter a single-phase series commutator type motor is mounted directly on the shaft of the converter.

Two trolleys are mounted on the roof of each unit; they are of the pantagraph type, but are unique in that they have been arranged so that if necessary they may be fitted with end horns which will automatically fold in when the pantagraph is lowered by the tunnel trolley wire. The trolley is raised and held in contact with the overhead wire by springs and is lowered by compressed air. Double insulation is provided for the pantagraphs, that is, two separate sets of insulators are arranged in series. If one set fails, the other set will be effective in sustaining the service.

On each unit there are four liquid rheostats, one for each motor. The rheostats are operated in pairs, each pair having in common, one storage reservoir and cooling tower, one circulating pump and one operating mechanism. The liquid rheostats provide the motor circuit resistance required in order that the speed of the motors may be slow at starting and may be gradually increased as the resistance is cut out of the circuit.

The essential elements of each rheostat are a cast iron tank in which are mounted electrodes consisting of certain metal plates connected to the motor and another set of such plates adjacent thereto and connected to ground; a hollow plunger, located at the center of the tank for regulating the height of the liquid and which is raised or lowered by an operating mechanism; and a motor-driven centrifugal circulating pump by which the liquid is continuously circulated to prevent excessive heating, the liquid being forced up through the bottom of the tank and over the top of the hollow plunger when the plunger is raised and back through the inside of the plunger to the storage reservoir.

When the liquid is raised so as to submerge the lower ends of the plates, current may flow between the motor-connected plates and the adjacent ground-connected plates, the circuit between the three phases of the motor being thus established. The higher the liquid rises on the plates, the lower the resistance becomes; when the plates are entirely submerged, the liquid going all the way up, the resistance is reduced to the minimum. To keep the temperature of the circulating liquid as low as possible, a portion is by-passed through a cooling tower containing a series of trays so arranged that the liquid will flow over them in a thin sheet and be cooled by air from the main ventilating duct to which the towers are connected.

For the purpose of cooling the various pieces of apparatus, there is a 36-in. Sirocco fan mounted on the shaft of the phase converter, and arranged to deliver the air to a duct built into the cab floor under the deck. The duct runs lengthwise through the cab and is arranged with openings at various points where con-

nections are made to the traction motors, phase converters, cooling towers, etc.

The following table shows the principal dimensions and weight of each complete locomotive:

Length overall	105 ft. 8 in.
Driving wheel base, total	83 ft. 10 in.
Rigid wheel base	11 ft. 0 in.
Truck wheel base	16 ft. 6 in.
Height, rail to pantagraph (locked)	16 ft. 0 in.
Height, rail to top of cab (maximum)	14 ft. 9 in.
Width, overall (maximum)	11 ft. 6 1/4 in.
Width over cab body	10 ft. 3 in.
Diameter of driving wheels	62 in.
Diameter of pony wheels	30 in.
Weight on drivers	220 tons
Total weight of locomotive	270 tons

The following table shows the performance of these locomotives under varying conditions of load:

	Train on 1.5 and 2 per cent grades	Train on 1 per cent grades	Train on 0.4 per cent grades
Weight of train, tons	3,250	3,250	3,250
Locomotives per train	2	1	1
Approximate speed, miles per hour	14	14	28
Drawbar pull per locomotive, lb.—			
Uniform acceleration	91,800	114,000	79,400
At speed on 2 per cent grade	75,400		
At speed on 1 per cent grade		85,800	
At speed on 0.4 per cent grade			4,600
Maximum guaranteed accelerating tractive effort per locomotive	133,000	133,000	90,000
Approximate maximum guaranteed h. p. developed by motors	5,000	5,000	6,700

On tests and in service the locomotives have developed a drawbar pull considerably in excess of the guaranteed maximum, the highest record with the dynamometer car being 180,000 pounds. This corresponds to an adhesion of about 40 per cent.

POWER STATION

The power station is of the usual type using steam boilers and steam turbines as the prime movers. It is located at Bluestone, on the Bluestone river, about 11 miles west of Bluefield, mainly for the reason that this is almost the only available source of water for boiler feed and condensing purposes in the district. Fig. 10 is a general view of the plant. The building is constructed of hand-burnt brick; the design is plain and substantial in character. The main structure is about 135 ft. by 158 ft., with a 52-ft. by 33-ft. extension at the northeast corner.

The main building contains a boiler room 79 ft 3 in. by 158 ft. 6 in., and a turbine room 56 ft. by 158 ft. 6 in. Across the east end of the turbine room a section 26 ft. wide is assigned for switching equipment, offices and other facilities, and fitted with intermediate floors and galleries. On the second, or mezzanine floor of this section, are located the locker and toilet rooms for the engineers and firemen. Above this, on the main floor, is the low tension switching room, which is separated from the turbine room by heavy wire screens. The next floor is the operating gallery, overlooking the turbine room, and a small office and a lavatory. The top gallery is used for offices. On the ground floor of the extension building or transformer house are the step-up and step-down transformers, and on the second floor is located the high tension switching apparatus.

The boilers, stokers, stoker engines and feed water heaters are located on the main floor of the boiler room, while the pumps, oil filters, air compressor, ash handling equipment, and the forced draft fans are in the basement, the pumps and filters being in a separate room. The main material storeroom also occupies a separate room extending along one side of the basement. The main turbo-generator units, exciters and signal generators, are located on the main floor of the turbine room, the condenser equipment and fans for cooling the generators being in the basement. The turbine room is spanned by a 30-ton traveling crane. The basement floors are at the ground level, while the turbine room floor is 18 ft., and boiler room 13 ft. 6 in. above.

Generators.—The main turbo-generators are of the Westinghouse type having a rating of 10,000 kw. at 80 per cent power factor, 11,000 volts, 25 cycles, single phase. At this rating, the generators are specified to operate for 24 hours with a rise in temperature not exceeding 60 deg. C. above the temperature

of the cooling air. They are capable of delivering a single phase output of 12,500 kw. at 80 per cent power factor for 5 minutes without injurious heating. The field coils are of the two pole type wound with copper strap and insulated for a one minute potential of 1,000 v., a. c. Provision has been made for the insertion of plugs for balancing. The armatures are wound for 3-phase power and are insulated for a one minute voltage test of 22,000 volts, and the insulation is capable of withstanding a temperature of 90 deg. C. without injury. Thermo couples imbedded in the armatures furnish a continuous temperature record. A view of the generator room is shown in Fig. 11. Each generator is ventilated by a No. 6 Sirocco blower, having a capacity of 50,000 cu. ft. of air per minute.

There are two turbine-driven and one motor-driven exciter generators. The turbo-driven sets consist of small Westinghouse horizontal turbines rated at 150 kw. The generators are compound wound machines of the rotary armature type with commutating poles and have a rating of 600 amperes at 250 volts when running at 2,200 r. p. m. The motor-driven set consists of a 3-phase induction motor rated at 150 kw. at 440 volts, 25 cycles, running at 720 r. p. m. The generator is a compound wound machine of the 6-pole type with a normal rating of 600 amperes at 250 volts. The motor takes power from a 3-phase self-cooled oil transformer rated at 200 k. v. a. A Tirrill regulator is used to vary the exciter voltage and current over sufficient range to insure practically constant voltage on all three main generators under all operating conditions.

Power for signal service in the electrified zone is supplied by two turbine-driven generators. Each set consists of a horizontal Westinghouse steam turbine direct connected to a 50 kw., 4,400 volt, 60 cycle single phase generator.

Switching Apparatus.—The main 11,000 volt bus is sectionalized and 3-phase power for auxiliary purposes is taken from the island section. No brick or concrete bus compartments are used, the bus being of copper tubing carried on insulators mounted on pipe framework. Copper tubing and bare wire is used wherever possible; insulated wire being used only where conductors are carried in conduits. The power supply to the 11,000 volt side of the three 5,000 k. v. a. step-up transformers is controlled by three 2-pole oil circuit breakers. The high tension leads from the step-up transformers, pass up through openings in the floor above to the oil circuit breakers and 44,000 volt bus. Copper tubing and bare wire are used in the bus work and wiring on this floor. The 44,000 volt bus is sectionalized, two high tension feeders being taken from each side. The high tension feeders and trolley feeders leave the building through openings in the south wall. The lighting arresters are located on the roof of the building.

All oil circuit breakers are electrically controlled from the operating gallery. Knife disconnecting switches are installed between busses and all oil circuit breakers and on the line side of all high tension and trolley feeder circuit breakers. Electrolytic lightning arresters are connected to all feeders.

The electrically operated switching and control equipment receives power from the auxiliary d. c. bus or a storage battery which is located in the northeast corner of the turbine room basement. This set has a capacity of 160 ampere hours at 220 volts, and is charged by a 5 kw. motor generator set located in the operating gallery. All switching apparatus is controlled from the operating gallery. The switchboards consist of a generator bench, main power board, auxiliary power board and a signal power board, as shown in Fig. 13.

Regeneration Loading Rheostats.—Excess regenerated power returned to the power house at no load passes to the 11,000 volt bus and through the various transformers back to the generators if the generators are running under very light load or no load. If no other load were provided, the regenerated power would reverse the generators and operate them as motors. To prevent this a loading device consisting of electrodes immersed in the intake canal and controlled by suitable switches is provided. The operation of the switches is made automatic by means of a group

of relays and magnetic switches, current transformers, etc., so connected as to give the following results.

When the amount of excess regenerated power reaches, say, 300 k. v. a. the closing relays throw in one water rheostat on the 11,000 volt bus. As soon as the regenerated power exceeds the capacity of one water rheostat by 300 k. v. a. another closing relay throws the second water rheostat in on the 11,000 volt bus. The difference between the amount of excess regenerated power and the capacity of the water rheostats in service is made up by the generators.

When the excess regenerated power has become reduced to zero with one rheostat in service all of the rheostat load being supplied by the generators one of the tripping relays trips the circuit breakers which cuts the rheostat off the 11,000 volt bus. With two rheostats in service, when the excess regenerated power drops to 2,000 k. v. a. one of the relays opens the breaker which was closed first and cuts one rheostat out of service. The other rheostat remains in until the excess regenerated power drops to zero when it, too, is cut out of service.

The water rheostats are located outside of the transformer house at the Bluestone power station. (See Fig. 13.) Each rheostat consists of a steel cone carrying a lead from the circuit breakers, and a fixed ingot iron plate located at the bottom of the intake canal, and grounded to a copper plate bedded in the earth outside of the canal. The power dissipating capacity is adjusted by varying the distance between the cone and the iron plate. The cone is raised or lowered in the water of the canal by means of a hand-operated winch and cable carried on a steel bracket across the canal.

Steam Turbines.—The initial equipment consists of three main generating units, with space provided for a fourth. These units are horizontal turbines of the Westinghouse-Parsons impulse reaction double flow type rated at 10,000 kw. with steam at 190 lb., superheated 150 deg. F. and 28½ in. vacuum when running at 1,500 r. p. m. The governor consists of an oil relay mechanism for operating the steam valves. Oil is maintained at a pressure of 45 lb. for the governor mechanism and reduced to about 10 lb. for lubrication. In case of interruption to the oil supply the stop valve automatically and instantly operates and shuts off the steam supply. A simple speed limit governor trips the automatic stop valve whenever the speed of the turbine exceeds a predetermined value. Each turbine is equipped with a separate condenser of the Le Blanc Jet type. The condenser injection water and air pumps are driven by a horizontal turbine. The air pump discharges into the intake canal and the ejection pump discharges into a pipe leading to the spray cooling pond.

Water for all purposes, excepting drinking, is taken from the Bluestone river by way of an intake canal. At the intake are two rows of 5 ft. by 7 ft. screens, having structural steel frames and three kinds of mesh—a fine mesh, 4 in. by 4 in. of No. 12 gage wire, medium mesh, 1 in. square of No. 10, gage wire, and coarse mesh, made up of 2½ in. by ¼ in. flat bars spaced 2½ in. on centers.

The water from the circulating pumps of all condensers is discharged into the cooling pond. If the supply of river water is low or not suitable for boiler use, it being very muddy at certain seasons, the water is sprayed into the pond and thence discharged into the intake canal. If there is sufficient cold river water of suitable quality, the water from the condensers is not sprayed but is discharged into the pond from which it is allowed to flow into the river reservoir several hundred feet below the intake and circulates up stream to the intake, the complete circuit being about 1,400 ft.

The cooling pond is 90 ft. wide, 296 ft. long and 5 ft. deep. Altogether there are 280 nozzles with space provided for addition of 140. The pond is capable of cooling 16,800 gal. per minute.

Boilers and Stokers.—The boiler plant comprises ten Stirling type water tube boilers, arranged in two rows with the firing aisle between, each row consisting of two batteries of two boilers each and one single boiler. Space is provided in the present building for four additional boilers. The boilers are designed for a work-

ing pressure of 225 lb. gage, and each has a total effective heating surface of 6,772 sq. ft., comprised in 3 steam drums 42 in. in diameter and 16 ft. 4½ in. long, and 487 tubes 3¼ in. in diameter. The boilers are equipped with superheaters capable of superheating the steam 150 deg. F. at normal rating. Each boiler is fitted with an underfeed stoker of sufficient capacity to evaporate 61,000 lb. of water per hour into steam at 200 lb. gage pressure 150 deg. F. superheat when supplied with feed water at 200 deg. F. The stokers are capable of developing 300 per cent of normal boiler rating when burning coal having a heating value of 12,250 B. t. u.'s per pound.

The forced draft installation in the boiler room basement consists of three Sturtevant multivane turbine driven fans, driven by steam turbines through a 4.1 herringbone reduction gearing. These turbines are of the standard Sturtevant E-5 type, and have a normal rating of about 300 hp. each. The stack is of the Custoclis radial brick type 268 ft. in length.

Steam from the exhaust header is discharged into horizontal Cochrane feed water heaters and purifiers located on the boiler room floor. These are of the cylindrical type, and each heater is capable of heating 225,000 lb. of water per hour from 40 deg. to 205 deg. F. The heaters are equipped with oil separators. The feed water is taken from the intake canal and pumped to the heaters by two lowhead pumps of the horizontal volute single stage double suction type, having a capacity of 650 gal. per minute. These pumps are direct connected to 20 hp. steam turbines. There are two suction lines to the lowhead pumps, each containing a Lagonda strainer. The two boiler feed pumps are of the horizontal volume three stage double suction type designed to operate against a working head of 600 ft. These pumps are driven by 175 hp. steam turbines.

The coal is received in hopper bottom cars on a siding along the south side of the power station. The cars discharge into a hopper under the tracks. Below the hopper is a single roll crusher which empties into an inclined conveyor of the continuous bucket type, having a capacity of about 60 tons per hour at a speed of 80 ft. per minute. This conveyor elevates the coal to a hopper at the east end of the boiler room monitor. From this hopper the coal is fed to a horizontal distributing conveyor. Two storage bins are suspended above and between the boilers from the building girders. Their capacity is about 350 tons. The coal handling machinery is driven by A. C. motors.

A narrow gage (24 in.) track is located under each row of boiler ash hoppers in the boiler room basement for steel platform cars, carrying two buckets of one cubic yard capacity each, which are used for removing the ashes. They are run outside the boiler room basement to a loading trolley emptied into the gondolas by means of a traveling electric hoist.

Compressed air is supplied for operating tools in the locomotive repair shop, for cleaning generators and for general use about the plant. The compressor is of the steam-driven type, having a capacity of 412 cu. ft. of free air per minute at 165 r. p. m., maintaining a pressure of about 100 lb. per sq. in. This equipment was supplied by the Chicago Pneumatic Tool Company, of New York City.

A complete signal communicating system has been installed. A monitor board is installed on the south wall of the turbine room. Symbols governing the operation of the main generators, exciters and signal generators are painted on ground glass and are illuminated by the operation of push button switches in the operating gallery. Return signal lamps are also provided on the main power board in the operating gallery. Pneumatic whistles are provided in the boiler room, pump room and turbine room, as well as the indicating signals at each main turbo-unit.

FACILITIES FOR INSPECTION AND MAINTENANCE

The inspection building and repair shop is a 148 ft. by 68 ft. structure of the same type as the power station which is just north of it. There are two main pits running the full length of the building. At the west end of the shop is a short wheel pit which is connected to the two other pits by means of a covered

lateral pit. This pit is equipped with a narrow gage track to handle the pneumatic jack by means of which the wheels are removed from the locomotives and run along to the storage track in front of the heavy wheel lathe. The southern pit is used almost exclusively for inspection. For this purpose a 112-ft. platform has been located 12 ft. 8 in. above the rails. All repair work is done in the northern part of the building, where the machine tools are located. This part of the shop as well as one inspection pit and the short wheel pit are spanned by a 30-ton Whiting crane.

The following machine tools are installed:

Motor Driven Tools—

- 80-in. heavy wheel lathe.
- 30-in. by 8-ft. planer.
- 60-in. by 6-ft. No. 1 horizontal boring and drilling machine.
- 3-ft. Mueller radial drill.
- 20-in. Stockbridge crank shaper.
- 73-in. boring mill.
- 36-in. double back geared lathe.

Belt Driven Tools—

- 1 Style C Diamond double emery grinder.
- 1 No. 5 mat Diamond wet tool grinder.
- 36-in. Aurora vertical drill.
- 18-in. by 10 ft. single back geared lathe.
- 14-in. Barr 2 spindle sensitive drill.
- 50-ton pneumatic press.

The building is well lighted by Tungsten lamps. Rolling steel doors are provided at the entrance to all tracks and the building is steam heated. The locomotives are not handled in the shop by their own power, but are drawn in and out by means of a cable and motor-driven winch, located at the east end of the building between the two main tracks. A blacksmith shop is located in an extension at the northwest corner of the building.

The headquarters for the maintenance of the overhead catenary trolley construction and the transmission lines are at Bluestone. The line repairmen will be available and subject to call at any time during the day or night. On a siding an emergency repair train consisting of a tower car, tool car and flat car is constantly held in readiness for heavy emergency repairs. The ordinary repairs, however, will be taken care of by comparatively small gangs consisting of three to five men, who will be sent out on small gasoline cars. Wherever possible repairs are made from the overhead bridges or from ladders, and in order to avoid interruption to electric service to the greatest extent possible, specially treated and impregnated wooden ladders are provided and can thus be used for light repairs to trolley fingers, clips and other details on the 11,000 volt catenary system while alive. Certain of the line repairmen are regularly stationed at one or two other points on the line from which they can quickly respond to an emergency call by the use of gasoline cars.

In order to expedite the inspection and maintenance of the line, a patrol telephone line is installed over the entire length of the electrified section. This patrol line is connected with the power house, and through the power house telephone operator communication can be had over this line with the train despatcher and other officials.

AUTOMATIC SIGNALING EQUIPMENT

The electrified section of the railway was formerly equipped with automatic signals of the d. c. type requiring primary storage batteries, these signals being usually mounted on posts along the track. Under electric operation, however, it was deemed advisable to make use of these signals, which were only recently installed and practically new, on other parts of the railway, and to provide new a. c. signals in connection with a. c. track circuits, the signals being mounted on the catenary bridges. This part of the work was carried out by the railway company.

EXCURSION FARES ON THE EGYPTIAN STATE RAILWAYS RESTORED.—The Egyptian state railway authorities, who at the beginning of the war increased all first and second-class fares by 10 per cent and suppressed return tickets and week-end tickets at reduced fares, have now re-established the latter, and week-end tickets between Cairo and Port Said, at about a fare and a half are again available. Port said is 210 miles from Cairo.

REPORT OF CHICAGO RAILWAY TERMINAL COMMISSION

The Chicago Railway Terminal Commission, of which John F. Wallace is chairman, has submitted a preliminary report to the Chicago City Council Committee on Railway Terminals, based on its investigation of the Chicago railway terminal situation since its formation on May 25, 1914. In addition to the Chicago situation the commission has made a personal examination on the ground of the terminals at Toronto, Montreal, Boston, New York, Liverpool, Manchester, London, Paris, Brussels and Antwerp. After a general discussion of the development and the present aspect of the Chicago railway terminal situation the commission submits a series of recommendations which it summarizes as follows:

"In the interests of the city, the railroads, the shippers and the general public, the railroad terminals now existing in the congested area bounded by the Lake on the east, Chicago avenue on the north, Desplains street on the west and Sixteenth street on the south, should be readjusted and simplified by combination and co-operation.

"The through passenger service of all the railroads now using terminals in that portion of the congested area above described, which lies east of the south branch of the Chicago river, should be combined in one, or two, union passenger stations, with the exception of such of these roads as can properly be taken into the new Canal street Union Station west of the river.

"Advantage should be taken of the substantial opportunities which now exist for the practical application of the through routing principle to Chicago suburban service. These opportunities would be increased by certain changes which are easily practicable.

"The present extensive and superficially spread out competitive freight terminals within the congested area should be regrouped and simplified. The commission is gratified to be able to report that it has found, on the part of a number of influential railroad officials, a distinctly favorable disposition toward this suggestion and a willingness to assist in the working out of practicable plans to carry it into effect.

"The south branch of the Chicago river should be straightened so that La Salle street, Fifth avenue and Franklin street can be extended through as continuous north and south thoroughfares, and so that railroad properties now cut off by the river and only superficially used, can be made available for intensive development. Provision for river-straightening was made in the Canal street Union Station ordinance, and the commission has secured assent to substantially similar provisions in the Baltimore & Ohio Chicago Terminal Railroad ordinance, and in the pending ordinance relating to the Chicago & Western Indiana Railroad. Other railroads, whose interests would be affected, have also indicated to the commission their willingness to co-operate in some practicable plan of river straightening. The commission has prepared certain tentative plans showing the river straightened and how the property then thrown east of the south branch of the river can be utilized to the joint advantage of the railroads and the public.

"No carload freight should be handled within the congested area, bounded as above, except that which is intended for consumption or use within the district. All other carload freight should be interchanged, transferred or delivered by co-operative methods, agencies and facilities outside of this district, such as those already adopted at Clearing by 12 of the Chicago railroads, operating 15 trunk lines. Here, or at similar co-operative yards, should be interchanged all carload freight which it is not essentially necessary to handle within the congested area. Less than carload freight should be interchanged or transferred, as far as practicable, on general principles substantially similar to those applied at Clearing to the carload freight. It is apparent that, to the extent that this interchange or transfer can be accomplished at one or more points outside of the congested area

of the city, a distinct public benefit will be conferred, and the railroads themselves will probably be financially benefited.

"Outbound L. C. L. freight should not, as a general rule, be sorted or loaded to destination at the freight terminals within the congested area. No outbound L. C. L. freight which had been loaded into trap cars on private sidings should be brought into this congested area, but should be taken directly from the point of origin to an outlying station or yard where it will be transferred as may be necessary. Outbound L. C. L. freight brought by teams or trucks to freight stations or team tracks within the congested area should be unloaded as directly as practicable from the vehicles into trap cars and should be taken in these cars directly to outlying clearing stations or yards, there to be transferred as may be necessary.

"Outlying L. C. L. clearing stations or yards should be established and operated by roads which do not already have them; and the co-operative or union principle should be applied and extended as rapidly as experience justifies and opportunity permits. This commission is not now prepared to say that the larger railroad systems may not find it advantageous to operate individual clearing station yards of their own or that one joint station or clearing yard may be found as efficient as two or more. It may be that there should be three union co-operative clearing stations or yards located in different sections of the outlying territory of Chicago and devoted to freight destined west and northwest, south and southwest, east and southeast, the sections into which the entire railroad system, when considered in relation to Chicago, naturally subdivides the country.

"Universal freight stations should be established at appropriate points in the central terminal area, in sufficient number to afford convenient opportunity for the shippers in the respective sections of this area to deliver at a single station L. C. L. freight destined to different roads, or at least to any of the roads within one of the above mentioned groups. The freight received at such universal stations should be taken to the outlying clearing station or yard of all the roads, or of the roads of one of these groups, depending on the system, and then this freight should be sorted, transferred and loaded to destination.

"In the event—but only in the event—that this service is found to involve extra expense to the railroads over the cost to them of handling freight teamed to their respective individual receiving stations, the shipper utilizing these universal stations should pay an appropriate charge for the privilege which enables him to reduce the cost and the delays of teaming. It is not suggested at this time that all the railroads should immediately adopt the universal freight station system, or that each railroad should convert all of its existing freight stations into universal stations. But it is believed that a sufficient beginning should be made on the universal freight station plan to give that plan a fair and adequate trial, and under circumstances which will permit of its extension to the extent that this is justified by experience.

"In the plans prepared by the commission, as tentative studies of the terminal situation, locations have been indicated for new universal freight houses by way of suggesting where such houses be located. In actually working out the problems, other locations may be found more suitable or more available. The commission has been gratified to find that the universal freight house principle is being given friendly consideration by Chicago railroad men, and it confidently hopes for the inauguration of this principle in the near future.

"None of the plans submitted is intended to represent the matured judgment of the Chicago Railway Terminal Commission. The sole purpose of all that is here presented is to report progress toward the solution of the railway terminal problem and to indicate some of the practical steps that may lead further in this direction."

The report contains a large number of interesting charts and statistical tables showing the present situation and the proposed development of the Chicago railway terminals, and also a general discussion of the terminal situation in other large cities of the

United States and in Europe which the commission visited last summer.

The commission consists of John F. Wallace, chairman, representing the city of Chicago; Walter L. Fisher and Bion J. Arnold, representing the Citizens' Terminal Plan Committee; Edward H. Bennett, representing the Chicago Plan Commission; L. E. McGann, commissioner of public works; John W. Beckwith, corporation counsel; Ellis Geiger, chairman, Council Committee on Railway Terminals.

DEMURRAGE REGULATIONS IN ENGLAND

The Railway Clearing House, London, has announced that on July 1, 1916, the following uniform regulations and scale of charges for demurrage on goods wagons will be put into effect throughout England, Scotland and Wales. The date is set far in the future because in a part of the country (Birmingham, South Staffordshire and South Wales) the new tariff will effect an increase.

FREE PERIOD

Before conveyance—

- At stations One day, exclusive of the day upon which the loading is begun.
- At private sidings and docks.... Two days, exclusive of the day upon which the loading is begun.

After conveyance—

- At stations Two days, exclusive of the day of arrival.
- At private sidings and docks.... Three days, exclusive of the day of arrival.
- At docks (shipment traffic only)... Four days, exclusive of the day of arrival.

CHARGES

Ordinary wagons.....1s. 6d. (36 cents) per wagon per day.
Sheets.....3d. (6 cents) per sheet per day.

High capacity wagons—

Per wagon per day

- Above 16 tons and not exceeding 20 tons carrying capacity 2s. (\$0.48)
- Above 20 tons and not exceeding 30 tons carrying capacity 3s. (.72)
- Above 30 tons 5s. (1.20)

Specially constructed wagons—

- Above 15 tons and under 20 tons carrying capacity..... 3s. (.72)
- 20 tons and under 30 tons carrying capacity..... 6s. (1.44)
- 30 tons and above 10s. (2.40)

Refrigerator and insulated vans—

- If not unloaded within one day, exclusive of day of arrival 6s. (1.44)

It appears that for many years prior to 1905, owing largely to competition between railway companies, the scheduled charges for demurrage on wagons and sheets were rarely enforced. Thereupon the railway companies' attitude was taken advantage of in several quarters and wagons were detained most unduly awaiting loading or unloading, and sometimes actually used as a trader's storehouse, being moved from place to place as found convenient. Finally, the companies were very seriously affected by shortage of available wagons, congestion in yards where large numbers of wagons were kept under load, and in other ways, and it became imperative to enforce demurrage charges.

Shippers and consignees are much the same, the world over, and we read that for a considerable time there was strong opposition to the new regulations on the part of traders, who withheld payment of the demurrage charges due. At a later date, however, they fell in with the decision given in the Scotch Courts in 1910 in a test case brought by the Glasgow & South-Western against a colliery company, this decision being in favor of the railway.

The rates shown above are already in force, and have been since February 7, last, except in the three districts mentioned.

AUSTRALIA ORDERS LOCOMOTIVES.—The Australian government has recently placed an order with a Queensland company for 20 locomotives for use on the trans-Australian railway, now under construction. Ten are to be delivered at Port Augusta, the eastern terminus, at a price of \$37,462, and ten at Kalgoorlie, the western terminus, at a price of \$35,355. The locomotives are about equal in weight to the heaviest locomotives now in use in New South Wales.

Convention of Master Boiler Makers' Association

Report of the Proceedings of the Last Three Days of the Ninth Annual Meeting, Held Last Week in Chicago

A report of the first day's proceedings of the ninth annual convention of the Master Boiler Makers' Association was published in the *Railway Age Gazette*, May 28, 1915, page 1129.

Frank McManamy, chief boiler inspector of the Interstate Commerce Commission, presented a paper in which he called attention to a tabulated statement of the work that had been done in the matter of boiler inspection by the commission during the first nine months of each of the fiscal years, 1912 to 1915 inclusive, with the results that had been obtained therefrom.

One of the causes of accidents, in the prevention of which satisfactory progress is not being made, is arch tube failures. Of course, when we take into consideration the increased number of arch tubes in use, some progress towards preventing failures has been made, but inasmuch as the records show that approximately three out of every four of such failures are due to improper application or failure to keep the tubes clean, the progress made is far from satisfactory and the remedy is, to a great extent, in the hands of the master boiler makers.

Accidents due to tube failures also indicate that, in too many instances, quantity rather than quality is the controlling factor, when passing upon the qualifications of the flue welder.

Failure of injector steam pipes is another source of accident in the elimination of which satisfactory progress is not being made.

OXY-ACETYLENE PROCESS FOR BOILER WORK

The report, after citing the necessity of having an oxy-acetylene apparatus in the boiler shop, gave a partial list of the work that can be done with it. This list, with the methods used, is as follows:

Welding in side sheets and patches. When welding in side sheets, some boiler foremen make an allowance for contraction by dropping one end of the sheet, while others get good results by not making any allowance for contraction. The welding in of side sheets, instead of riveting them, has been made a standard practice by some railroads; in fact one railroad is now cutting the side sheets off just above the mud ring and also at the seam at the crown sheet. In this way they save taking out the mud ring rivets and do not disturb the corners. When welding patches in side sheets, good results have been obtained by putting in round or oval shaped patches. Other roads use disk or make box patches for welding. It is necessary to do this to take care of the contraction.

Building up washout plug holes around the firebox or front flue sheet.

Welding cracks in side sheet doors and crown sheets.

Welding up cracked bridges in flue sheets. One method used in welding cracked bridges is to cut out the crack, then hammer the ends of the bridge in and weld. After it is welded and while hot, it should be hammered back straight. This takes care of the contraction. There are some welders who can weld broken bridges without doing this.

Welding seams in door holes instead of riveting or plugging. This is done in two ways; one is to make the lap of the door flange long enough to cover the holes in the back head and weld what would be the calking edge, if rivets were used. The other is to cut the flange in the back head off just back of the rivet holes and butt the door flange to it; then weld it the same as welding in a patch or side sheet.

Welding in tube sheets and door sheets. This is now being done by some railroads; in fact, fireboxes are now being applied in which the only rivets used are those in the mud ring.

Welding cracked and broken mud rings. The general practice in welding cracked or broken mud rings is to cut a piece out of

the firebox sheet, then cut a V-shaped piece out of the mud ring and weld the ring from the top side, although some successful welds have been made by cutting out a V-shape and making the weld from the bottom.

Welding tubes in back tube sheet. The welding of tubes in back tube sheets does not seem to be as successful with oxy-acetylene as with the electric process. It is also slower. Some success has been reported where copper ferrules are not used.

Welding up pits in tubes. Large savings are reported by some railroads doing this.

Welding safe ends on superheater flues. In doing this, two methods might be mentioned; one is to butt weld by placing the flue and safe end in an angle iron, spot weld it in four places, then turn the flue while the operator welds it. The other way is to bell the flue if the weld is made on the firebox end and insert the safe end, leaving a lap of $\frac{1}{2}$ in. The weld is then made at the edge of the flue. If the weld is made on the front end of the flue, the safe end should be belled. This is done so the edge will not obstruct the flow of gases or the flames get under the lap. The claim made for welding flues in this manner is that in case the weld should fail, the danger of breaking off is removed by the lap holding the flue.

Welding up staybolt holes in side and crown sheets. This saves bushing holes and sometimes patching.

Some of the uses for the cutting torch are: Cutting out shell sheets; cutting out firebox sheets; scrapping boilers; cutting out superheater flues; cutting out countersunk rivets; cutting off rivets on shells and mud rings; cutting off staybolts and radial stays; and cutting off staybolt ends for driving.

In order to use the oxy-acetylene process to the best advantage, the shop should be equipped with an acetylene generating plant and piped throughout.

Without going into the chemistry of the subject, it is pertinent to point out that purity in oxygen is of first importance, not only because the foreign matter usually enters to some extent into combination with the metal of the weld, but because the flame temperature is reduced and the rate of welding or cutting is also reduced. Oxygen loses rapidly in efficiency with each per cent of impurity much the same as incandescent lamps lose rapidly in candle power for small drops in voltage.

With reference to the manufacture of oxygen, it was stated that at the present stage of the art, it is unwise for any company to generate oxygen by chemical means unless in some small shop exceedingly remote from any source of supply of commercial oxygen.

The largest producer of oxygen in this country employs the liquid air process. That company is admirably equipped for meeting its customers' needs, since it has 10 plants and 16 warehouses at important cities throughout the country. Any user realizes the value of an unfailing oxygen service represented by numerous charging stations and by hundreds of thousands of cylinders. Since freight charges enter into the cost of oxygen, numerous sources of supply and cylinders of minimum weight are both important factors.

Liquid air oxygen has a very small percentage of nitrogen which, being an inert gas, does not make an explosive mixture with the oxygen, and on that account the liquid air product is absolutely safe. Recent competitive tests in cutting operations have shown liquid air oxygen to be high in efficiency; in fact it invariably demonstrated its superiority over oxygen produced by other systems.

Oxygen cylinders can be brought to the work, but in large shops, or in fact in any shop employing two or more welders, it is better to install a pipe and to discharge a battery of 10 to 20

cylinders into it through one reducing valve. This plan has the advantages, first that the gas is available at numerous points in the shop, and second that the operators lose no time through shortage of oxygen, or through carting cylinders from job to job or to and from the storehouse. A continuous supply of oxygen is a valuable asset in doing long jobs.

Acetylene can be used with perfect safety. In selecting a generator, one should only consider those which have been approved by the laboratory of the National Board of Fire Underwriters. None but carbide to water feed should be considered.

In this country there are two principal classes of generators, high pressure, by which is meant pressure over one pound per square inch, and low pressure, or less than one pound per square inch. All things considered, the pressure type is the better for railroad work.

Low and constant pressure is desirable for safe and economical operation. The Underwriters' rules prohibit pressure, on undissolved acetylene, in excess of 15 lb. per sq. in. Most high pressure generators work up to 15 lb., which is taken as the maximum safe pressure because acetylene is unstable under high pressures and one of the essentials, in fact the greatest essential of safe operation, is low pressure.

It is absolutely certain that any shop possessing apparatus generating or storing free acetylene above 15 lb. pressure is courting accident.

It is not wise from the standpoint of safety to truck any form of acetylene generator through a crowded railroad shop. Danger from tipping over, collisions, falling objects, electric wires, portable furnaces, etc., make it much more risky to use a portable generator than to isolate a stationery machine in a small separate building designed for the purpose, and to carry the gas, by approved methods of piping, throughout the shops.

A question might well be asked concerning the attendance expense of the duplex generator. It is very low. In one shop, near Chicago, employing nine welders regularly, one of them tends to the oxygen manifold and acetylene generator. Those duties occupy him, on the average, 1½ hours per working day of nine hours. Therefore the attendance requires 15 per cent of the time of one man out of nine or 1.85 per cent of the total time of all the welders, an almost negligible item of expense.

No operating problems are involved, providing the pipe lines are properly laid out and installed, to give safe and economical service, such as hydraulic flash back traps which absolutely prevent fire from traveling backwards through the hose to the pipe line.

Without going into details here, it is correct to state that any shop regularly employing two or more welders should pipe for both oxygen and low pressure acetylene, rather than to use any form of portable apparatus.

Because of the unstable nature of acetylene under pressure, it cannot be stored in tanks or cylinders like air or oxygen, but must be compressed in receptacles containing fibrous material, usually asbestos and also a liquid known as "acetone."

Acetylene in this form is very useful for lighting purposes and for operating blow pipes at remote points, where pipe lines do not reach and generators would prove too bulky. Emergency work, such as cutting operations at wrecks or occasional jobs at small outlying shops can best be handled in this way, but it is not advisable for many reasons to regularly use the tanks in shops employing two or more operators.

The main repair shops of railroads owning 150 or more locomotives should not entertain compressed acetylene installations, simply because the volume of work warrants a generator plant in order that the highest operating efficiency may prevail.

Compressed acetylene costs the consumer from 2½ cents to 3 cents per cubic foot at the blow pipe, when all items of expense are considered, such as first cost, freight, investment, etc., compared to a cost of less than one cent for acetylene from a generator. The presence of the acetone in the cylinders, mentioned above, has an important bearing on operating expenses. Most acetylene cylinders are made in sizes suitable for lighting pur-

poses, where the demand of the burner is much less in cubic feet of acetylene per hour than when blow pipes are used, especially the larger ones, such as used on locomotive work. Consequently when the blow pipe requires from 40 to 60 cubic feet of gas per hour, as on plates ¾ in. thick and larger, on mud rings, frames, etc., the cylinder is worked beyond capacity, especially if not freshly charged, and there is difficulty in getting ample acetylene for the burner, without drawing out some of the acetone, which has the bad effect of reducing the temperature of the welding flame, thereby reducing the efficiency and raising the cost of doing work. Also the replacing of acetone at the time of recharging is a factor in the cost of gas.

DISCUSSION

Care must be exercised to see that the proper proportions of oxygen and acetylene are used. If there is too much acetylene there will be a tendency to crystallize the metal, and if the oxygen is in excess the metals will be oxidized. It is also well to have the sheets brought together and heated to a welding temperature so that they are really joined before putting in the welding material.

ELECTRIC WELDING IN BOILER MAINTENANCE

It was the opinion of the committee and a number of boiler makers who were consulted that it is a mistake to weld cracks in fireboxes, more than 8 in. long, as it is only a temporary job and gives much trouble. They have to be rewelded often and this should not be practiced in back shop repairs. A horizontal crack can be more successfully welded than a vertical crack, as the expansion of the firebox is more even vertically than horizontally. This is true in welding cracks in the top flange of tube sheets, as horizontal cracks have been welded and known to give good results for engine house repairs, holding up for six and eight months when cracks from tube holes to rivet holes have to be rewelded often.

In getting sheets, patches and cracks ready for welding, the best results are obtained by beveling both edges of the sheets, or cracks, at 45 deg., and leaving an opening 3/16 in., so as to get the weld through the sheets. In building up thin spots or reducing the size of holes, all scale and grease should be removed, as clean sheets insure good welding. All welds should be built up 1/16 to ¼ of an inch.

The chairman of this committee has had much success in welding tubes at the firebox end and at the time of this report the Erie division of the Northern Central has tubes welded in passenger service that have been running two years and three months.

The welding of tubes, if properly done, will reduce the tube troubles to a minimum. Where tube welding is a failure it is usually due to the use of improper methods.

The tubes should be applied the same as if no welding was being done, except that no oil should be used on the tools in working the tubes, for electric welding is unsuccessful if oil is on the work. The proper way to prepare tubes for welding is as follows: After ferrules are applied and tubes in place, an oil soft soap should be used as a lubricant instead of oil, on the tube pressers and rollers, after the tubes are beaded; rough the sheet around the head with a roughing tool ¼ in. wide. This will remove all the scale from the sheet and gives good metal for welding; then heat the sheet with a burner, which will burn up the soft soap, and this will leave the sheet free from grease and the tubes are ready for welding. Any time the sheet gets wet, dry it or leaky tubes will result.

Care should be taken that the voltage is not too high. High voltage makes it easier for the operator, but it is not good for the tubes, as the operator with high voltage keeps the metallic pencil ½ to ⅝ in. from the sheet and the metal only sticks and does not weld. A voltage of 64, and 125 amperes makes the operator get within 3/16 in. of the sheet and at this distance a good weld results.

Such good results are not obtainable in welding tubes that have been in service eight or ten months before the welding, as from welding tubes at the time they are applied. Tubes, if properly

welded at the time they are applied, should give three years' service as far as the firebox end is concerned. It pays to weld tubes if only one year of service is obtained as it will eliminate the engine house tube trouble.

The general opinion of the committee is that it is an advantage to use electric welding for side sheets, patches on mud ring corners, small cracks, building up thin spots on sheets and welding tubes, but a disadvantage to weld long vertical cracks in any sheet where there is expansion and contraction.

DISCUSSION

The discussion was almost entirely limited to a consideration of the welding of tubes, as this was the principal use to which the electric welding was applied. It was recommended in connection with this that no oil should be used on the work. The holes should be drilled with soda and a soft soap made of linseed should be used with the expanding and rolling tools.

UNIFORM RULE FOR LOAD ON STAYBOLTS

The maximum allowed load on staybolts and boiler braces has been fixed by the rules of the Interstate Commerce Commission, hence the committee confined itself to a recommendation as to the diameter of staybolts to be used. This recommendation was made because small staybolts are more flexible and give greater life to fireboxes than large bolts; the first firebox will last longer than the second; the second will last longer than the third. The shorter life of the second and third firebox is due to the increase in the size of staybolts made necessary by repeated application of staybolts. It was recommended that $\frac{7}{8}$ in. staybolts be applied as a minimum and that 1 in. be the maximum size, and that all bodies of rigid bolts beyond 1 in. be turned down to 25/32 in. between the sheets.

THE STANDARD SLOPE OF CROWNSHEETS

The investigations of the committee showed that there was no standard slope for crownsheets, but the recommendation was made that $\frac{1}{2}$ in. to the foot be used, starting at the tube sheet and going back to the door sheet. The camber should be $\frac{3}{4}$ in. to the foot each way from the center.

Sheets constructed in this manner are comparatively easy to keep clean and free from scale and sediment, and will give the best results.

The advantages of a sloping crownsheet are:

First: In case of low water the highest point in the crown-sheet will become over-heated first, and in all probability will let go quicker and do less damage than if it had no slope.

Second: With this slope the heat strikes the crownsheet more uniformly and is more evenly distributed, thereby causing less strain on the sheet and giving greater life to crownsheets and better results therefrom.

Third: There is more absorption of heat units in the front end than in the rear end of the firebox, and more room is allowed for combustion to take place.

Fourth: A greater amount of heating surface can be used at the front than at the rear end.

Fifth: It gives more room for tube spacing in the back tubesheet.

Sixth: It also gives more room for cab and cab mountings.

The only disadvantage of the sloping crownsheet is that in the construction of the crown and side sheets in one piece there is more waste of material.

TREATING LOCOMOTIVE FEED-WATER

The report gave a general review of the situation as to feed-water treatment and called attention to the fact that an untreated water, although low in incrusting solids, may have a decided tendency to cause foaming, when used in connection with treated water; and at the same time cause incrustations of injectors, line checks, and boiler check valves.

While no recommendation to that effect was made, the tone of the report seemed to favor the treatment of water in the locomotive tanks rather than in roadside treating plants.

DISCUSSION

The treatment of water has effected a very considerable saving on the Missouri Pacific. At Kansas City, where the water is of 36 grains of hardness, the life of tubes when using the raw water was limited to about 10 months, whereas by the use of water treated in a plant, the life has been lengthened to 21 months, while leaks in the firebox and cracks in the sheets have become things of the past. On the Colorado division pitting occurred to such an extent in the tubes that, after cleaning from scale, it was usually necessary to throw at least 65 per cent of the tubes into the scrap. The water also attacked the crown-sheet. It has been found that it is not good policy to mix treated and untreated water in the boiler as it is apt to start pitting and other troubles. On the Wichita division, there are no treating plants and the water is treated with soda ash in the tanks, and here, too, the life of the tubes has been increased from 9 to 14 months. However, it is generally recognized that it is not desirable to use the boiler as a treating plant and that the work had best be done before the water is put in the boiler.

This attack on tubes by the water of the Colorado division was not due to the kind of tube used, as experiments have been made with every tube on the market, the results all being the same. In these bad water districts it is necessary to wash the boiler out every 400 miles.

Another speaker stated that the use of soda ash had made it possible to extend the period between washouts by 33 per cent and that there had been no bad effects noticed as the result of the soda ash treatment.

One representative had had an extended experience with the use of polarized mercury and he found that the period between washouts could be extended by about one-third. He found that there is considerable difference in the manner of the circulation of the water when used in boilers having long tubes from what it is in those with short tubes and that this circulation is much freer with the latter. Polarized mercury does not create any tendency to pit, nor does it produce any galvanic action, and when it is used the tubes have a life of about two years and seven months, possibly a little more. Put in figures of miles run this means that the tubes have a life of about 120,000 miles, whereas, before this, they were sometimes limited to 17,000. There were records of a tube life of 147,000 and even 262,000 miles.

In another case it was found that the failures of tubes as indicated by cracking had greatly decreased after the introduction of soda ash treatment, while the number of burst tubes had greatly increased, as the soda treatment seemed to have increased the tendency to pit.

There was a marked difference in the action or apparent action of locomotives fitted with superheaters from those using saturated steam. With the latter, when the tender treatment had charged the water up to the foaming point the foaming was very evident, but in the case of the superheater locomotives, considerable foaming could apparently occur and the water that was carried over into the superheater pipes would be dried out and be delivered to the cylinders in the form of steam.

There was some evidence given to support the idea that the use of soda ash tended to cause pitting, though there were a number of speakers who stated with great positiveness that they could not detect any such tendency.

It was also agreed among those who had had any experience in the use of pure water, such as water that had been treated to a condition of purity, or rain water, that such waters did have a tendency to produce pitting.

CROSS STAYS IN FIREBOXES

In the Belpaire firebox, and some designs of crown bar fireboxes that have flat or nearly flat surfaces where sheets converge from the side to the roof, it is necessary that they be properly braced with cross stays. In this construction, however, there is a considerable distance between the connections of the firebox staybolts to the roof sheet and the necessary slings,

braces or stays in the crown sheet, which permits of a certain flexibility, that will allow some adjustment to take care of the stresses which are the result of the greater expansion of the side sheets of the firebox under the high temperature of direct contact with the fire, as compared with the expansion of the outside side sheets.

The radial stay boiler, however, should have a circular cross section above the crown sheet, and the use of cross stays in this type of boiler restricts the proper equalization of stresses, which result from the unequal expansion of the firebox, as compared with the roof sheet, which, in the case of radial stay boilers, has practically a continuous connection through the staybolts and radial stays. It is believed that a rigid cross stay above the crown sheet in a radial stay boiler increases the bending stress in radial bolts at about the line where cross stays are applied. Breakage of radial staybolts, in the zone indicated, has been experienced, due to the presence of cross stays in this type of boiler, and when their use was discontinued no further trouble from this cause was apparent. The committee does not consider cross stays in the radial stay boiler desirable or necessary, provided the boiler is properly designed with a circular cross section.

REDUCTION OF STRENGTH IN CORRODED OR PITTED BOILER SHELLS

An examination, supplemented by drilling at what appears to be the thinnest part, should be used to determine the thickness of the sheets, and in no case should the boiler be allowed to pass without repairs if the percentage so found has approached closely to that of the joints carrying the same strain.

DISCUSSION

It was suggested, inasmuch as there is no law or generally accepted practice in this matter, that the marine regulations should be adopted, in which the thinnest part of the sheet is the controlling factor. It was also suggested that the age of the boiler should be taken into account in determining the reduced percentage of strength that should be allowed and the practice of the Pennsylvania Railroad was cited as a case in point. On that road the factor of safety is made 4 for the first five years; from 5 to 10 years it is $4\frac{1}{2}$; from 10 to 15 years it is 5; from 15 to 20 years it is $5\frac{3}{4}$; from 20 to 25 years it is $6\frac{1}{2}$; from 25 to 30 years it is 10 and at the age of 30 years the boiler is scrapped.

DRIVING STAYBOLTS

The objection to driving staybolts with pneumatic hammers and holding-on bar is that the vibration of the holding-on bar, when a pneumatic hammer is used, is such that a number of blows are struck by the hammer while the holding-on bar is rebounding; therefore the bolts are not properly upset in the holes, and naturally the method does not make a good tight job.

To drive staybolts or radial stays successfully with air tools, it is absolutely necessary to hold them on by the same process; the trouble is not in the driving of the bolt any more than it is in the improper methods of holding-on.

In driving these bolts, use a set slightly higher in the center than on the edge, with a small radius on the outer edge, and a staybolt set made especially for this work. This set is used on the inside, as well as the outside end of the bolts; this cuts off all the ragged particles that may be around the edge of the bolts, making a smooth job, which is less liable to gather any accumulations of foreign matter. This work is done with a No. 90 air hammer, and held on with air holding-on tools, made especially for this class of work. In some places a set is used with a center tit to drive the bolt on the outside. This is done where the tell-tale holes are put in staybolts before the bolts are applied. The tit is inserted in the tell-tale hole so as to keep the set centered on the bolt as well as to keep the tell-tale holes in the bolts from being closed up; this is also a very successful method, but some prefer to apply the bolts and have them driven solidly in the center, before the tell-tale hole is drilled. Either one of these methods is good practice.

The trouble with leaky staybolts is not always due to the improper driving, or methods used in driving. There are quite a number of other reasons that contribute directly to these troubles, and if not properly taken care of, the bolts will leak and give trouble, no matter by what method they are driven or held on. It is absolutely necessary to have good threads in all staybolts, as well as radial stayholes, and a full thread on all bolts. It is necessary to have bolts fit the hole properly. If the staybolt and radial stayholes are properly tapped and the bolts have first-class threads, and are properly fitted to the holes, three full threads will be sufficient to make a good serviceable head.

The report closed with a recommendation to use a longstroke air hammer for the work.

REMOVING AND REPLACING FIREBOXES

On the different classes of boilers on the Santa Fe, there is an extra back end suitable for interchange so that when an engine enters the shop, the back end can be cut off and the extra back end complete with new firebox applied, holding the engine not to exceed ten days. This method has a new back end in reserve for interchange, and has proved satisfactory.

It is not necessary to remove the frames or break the connection at the smoke box on engines of the modern type whose firebox is directly over the frames. Experience has also taught that it is a more expensive method to cut the back end and door sheet loose, in order to avoid cutting away at the connection.

In some cases where the O G box passes through the frames, it is customary practice to separate the boiler at the smoke arch and have the work done in the boiler shop, going over the machinery while the boiler is receiving a new firebox. Otherwise it is simply cut off and the back end is replaced in the manner described.

It costs at the Topeka shops from \$650 to \$900 to put the firebox and back end in first-class shape, depending solely on the size of the boiler. Where the fireboxes are interchangeable, it is not necessary to bring the boiler to the boiler shop, but simply put it in the rear of the file of engines to be turned out of the shop during the month.

The way in which the work is done must be governed largely by the facilities of the shop doing it.

Where there are proper lifting appliances and the erecting shop space, it is more economical to lift the boiler from the frame and send it to the boiler department and the frame to a department for necessary repairs. This will give a track in the erecting department to repair another engine while the boiler and frame are undergoing repairs.

DISCUSSION

The discussion centered around the variations in the methods of removing and replacing the firebox without cutting out the back head, and this was the method in general that was used by the speakers with one or two exceptions. In detail the work was done by cutting off all the staybolts and cutting up the inside sheets with a torch, merely leaving two staybolts in each piece that were cut off, to hold it in place until all of the work was done, and then cutting the pieces loose and allowing them to fall out. The work can be done with the boiler either in the frames or removed. Sometimes the firebox was burned out as a whole and dropped down; sometimes the boiler was turned upside down and the firebox lifted out. In some cases the firebox was put in intact and riveted in place; in others it was put in piecemeal and sometimes each sheet was put in by itself and fitted and riveted. In other words, the new firebox was built in place. It seemed to make no difference whether the firebox were of the wide or narrow type, it is well to cut it out without removing the back head.

OTHER BUSINESS

The report on constructing locomotive tanks consisted of a brief review of the steps to be taken in the construction of a tank of the ordinary type with a mere reference to the circular tank of the Vanderbilt type.

The secretary's report showed that at the beginning of the year there were 419 members in good standing, that there were 77 new members taken in during the year and that there were 125 of these who were dropped, resigned or had died, leaving a present membership of 371.

The following officers were elected for the ensuing year:

President, Andrew Green, general foreman boiler maker, Big Four, Indianapolis, Ind.; first vice-president, D. A. Lucas, general foreman boiler maker, Burlington, Havelock, Neb.; second vice-president, John B. Tate, foreman boiler maker, Pennsylvania Railroad, Altoona, Pa.; third vice-president, Charles P. Patrick, Erie Railroad, Cleveland, Ohio; fourth vice-president, Thomas Lewis, general foreman, Lehigh Valley, Sayre, Pa.; fifth vice-president, Thomas F. Madden, general boiler inspector, Missouri Pacific, St. Louis, Mo.; secretary, Harry D. Vought, 95 Liberty street, New York City; and treasurer, Frank Gray, 705 W. Mulberry street, Bloomington, Ill.

INFORMATION DESIRED BY INTERSTATE COMMERCE COMMISSION FOR PASSENGER RATE CASE

The Interstate Commerce Commission has addressed to the western railroads a list of 18 interrogatories outlining the character of the evidence and data desired by the commission to be presented at the hearings to be held at Chicago beginning on July 6, on the advanced passenger fares filed by the western railroads, which have been suspended. Responses are to be made by the president or chief accounting officer of each road, and filed at the opening of the hearing.

Questions 1 to 5 relate to the separation of operating expenses between passenger service and freight service. Carriers that regularly make such a separation are asked to submit a statement for the years 1913 and 1914, showing for each primary expense account the amount directly allocated to freight service or to passenger service and the amount of expenses regarded as common, giving the division of the common expenses on bases deemed by carrier to be most nearly equitable. Question 1 states that the basis of division should be stated for each account and that the data used in making the apportionment of the common expenses should be given. Question 2 asks for a statement showing the total operating revenues for the years 1913 and 1914 of the freight service and the passenger service. Question 3 asks for a statement showing the operating ratios for both services for 1913 and 1914. Question 4 asks for a statement showing by years for the period 1907 to 1914, the total revenues, expenses and operating ratio for passenger service and freight service, respectively, for each year or for such part of the period as the separation has been made. Question 5 asks carriers that have made any study of the subdivision of the revenues and expenses of passenger service, as between the various classes of service, to describe the methods and results of such study.

Question 6 asks for the information, for the two years ending June 30, 1914, as to passenger miles per passenger traveling, in sleeping and parlor cars; revenues on account of such passengers, essential features of contract with a sleeping car company, and passenger train car miles classified as between the various kinds of cars. For express cars and cars used for various services the commission desires information as to the car foot miles made in the baggage, mail, express or other service. This question also calls for information as to the average weight and length of standard cars used in the various services and repairs per car mile.

Question 7 asks information regarding the revenues and expenses of dining car service. If dining cars are operated on certain trains or between certain points at a loss, the commission desires to know on what ground the operation of such cars is justified or in what way the just demands

of the traveling public could be met without entailing such a loss. Question 8 asks about the profitability of other branches of the passenger service which can be definitely segregated, with revenues and expenses for a period of two years.

Question 9 asks for a statement as detailed as practicable, showing changes in the character of passenger service during the past 10 years, including specific illustrations as to the speed of trains, kind and weight of passenger train cars and frequency of service, safety and comfort of passengers. Question 10 asks whether the respondent furnishes any passenger train service considered unwarranted or unnecessary to meet the reasonable demands of the traveling public, and if so, a statement of the amount of such service considered unnecessary, with the reasons why it is furnished.

Question 11 asks whether the roads have made any investigation to determine the relative profitability of passenger trains of different classes, such as suburban passenger business, and if any investigation has been made of the relative profitability of through passenger trains between important terminals or in highly competitive territory, and trains in districts or communities where competition is not so keen, the commission desires a statement of the results.

Questions 12, 13 and 14 ask for information regarding changes in the labor cost per unit of service rendered, increases or decreases of rates of wages since July 1, 1907, with the effect upon the cost of conducting freight and passenger service, changes in the cost of fuel and in the cost of cross ties since 1907. Specific questions are asked regarding the practice of using treated ties, the proportion of such ties, the estimated average life, etc.

Question 15 asks for information regarding important changes since 1907 in the price of materials and supplies other than equipment, cross ties and fuel. The roads are asked to submit a list of articles on which there have been marked changes in price. Question 16 asks for the purchase price of passenger equipment in 1914 as compared with 1907, with reference to weight and tractive power of locomotives, and weight and seating capacity of passenger cars.

Question 17 asks for a statement of the result of any attempt to separate the cost of road and equipment as between property assignable to passenger and freight service, and property used in common.

Question 18 asks what sums have been expended in raising the standard of the property which have been charged to operating expenses.

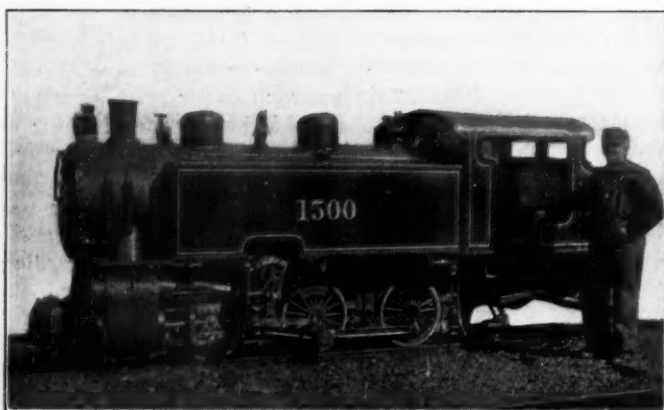
BELGIAN COAL INDUSTRY.—The production of coal in Belgium has increased of late, although yet a long way below the normal, and it is still proportionately lower than the reduction in the number of hands. This is due to the less skilled hands, which it has been necessary to employ to a considerable extent, and to the circumstance that, in many places, they do not work every day, only five or four, or even not more than three days, a week. The coal mines belonging to the mixed undertakings—Cockerills, Ougrée-Marihaye, and others—in the first instance satisfy their own requirements. The mines of Louvière and Sars-Longchamps are working, and have even lately added a new pit; also the Houssu concern is working a new pit. The most active working takes place in the Charleroi district, where several concerns have joined in one union so as to be better able to overcome the difficulties of the railway traffic. The improvement in the canal traffic may also help to facilitate the transport of coal, even if only by degrees. The situation at Charleroi has been a little less hopeful of late on account of a reduction in the domestic demand, and stocks are apparently accumulating in the absence of any export, and with reduced requirements on the part of industry and the railways. At the end of December there were about 300,000 tons stock in the Borinage district, but financial difficulties stand in the way of greater activity.—*Engineering*.

MINIATURE RAILWAY AT THE PANAMA-PACIFIC EXPOSITION

BY BRADLEY B. BROWN

The large area covered by the Panama Pacific Exposition has created demands for transportation about the grounds which have been met in several ways. The most interesting means employed is the Overfair Railway, a 19-inch gage line operated by steam locomotives.

The road has five locomotives, four of the Pacific type for passenger service and one six-coupled tank engine for switching service. These locomotives are larger and more powerful than



Tank Locomotive for Switching Service

most miniature engines and the design is such that their general lines follow closely those of standard gage steam road locomotives, while the working parts are designed with a view to obtaining the greatest efficiency in the service for which they are intended. As compared with large locomotives the principal dimensions of the miniature engines have been made one-third size but it was necessary to make some parts larger than called for by this scale. For instance the cab had to be made large enough to accommodate two enginemen and as shown in one of the illus-



Pacific Type Passenger Locomotive for the Overfair Railway

trations, it was necessary to use a full size eight-inch air pump.

The principal dimensions of the Pacific type locomotives are:

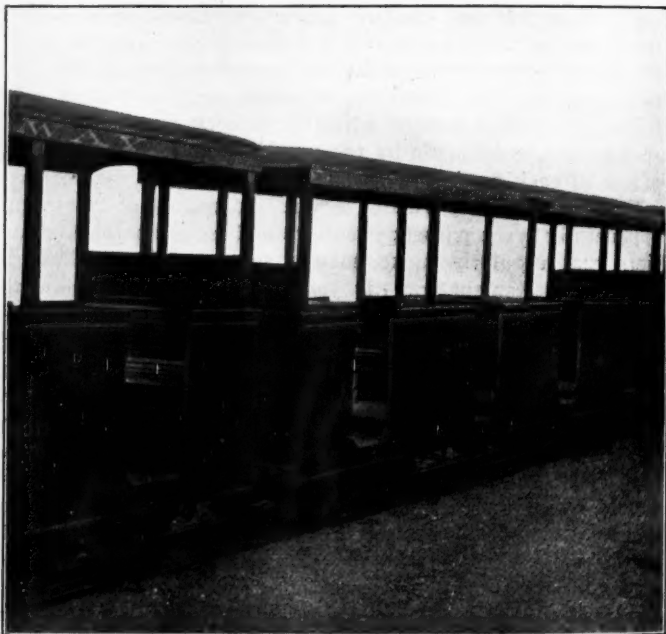
Gage	19 in.
Fuel	Hard coal
Total weight	24,000 lb.
Weight on drivers	15,000 lb.
Tractive effort	3,765 lb.
Total length	17 ft. 2 in.
Total wheel base	12 ft. 1 3/4 in.
Height from top of rail to top of stack	5 ft. 6 in.
Diameter of drivers	26 in.
Cylinders, diameter and stroke	8 in. by 9 in.
Valves, type	Piston

Valves, travel	2 1/2 in.
Boiler pressure	200 lb. per sq. in.
Firebox, length and width	36 1/2 in. by 31 1/2 in.
Tubes, number and diameter	162—1 1/4 in.
Tube heating surface	404 sq. ft.
Firebox heating surface	39 sq. ft.
Total heating surface	443 sq. ft.

The switching engine weighs nine tons, has cylinders 7 in. in diameter by 9 in. stroke and driving wheels 19 1/2 in. in diameter. All five locomotives are equipped with the Walschaert valve gear.

The passenger cars are built of wood and weigh approximately one ton each. They are 20 ft. long, 3 ft. 6 in. wide and 5 ft. 1 1/2 in. high inside. Each one seats 16 people, the seats being so arranged that half the passengers ride forward and half backward. There are 64 of these cars, all of which are equipped with automatic couplers and automatic air brakes.

The line starts at Machinery Hall and follows the bay shore westward for two miles, terminating at the race track. There are five intermediate stations on the line. A branch line continues westward for another half mile, terminating at the aviation field. The engines will start 12 loaded cars on level track and attain a speed of 16 miles an hour in a distance of one-fifth mile. The stations are so near together, however, that full speed is never reached. The time required to make the run between Machinery



Cars Used on the Overfair Railway

Hall and the race track is 15 min. and a fare of 10 cents is charged.

The entire line is double tracked and laid with 20 lb. rails. The track is largely level, there being only a few short grades; the sharpest curves have radii as small as 100 ft. but the trains take these without difficulty. Turntables are provided at the three terminals.

The locomotives and rolling stock were designed and built in the shops of L. M. MacDermot, Oakland, Cal.

ENGLISH RAILWAYS INCREASE CARTAGE CHARGES.—The English railways have recently found it necessary to make increases in their cartage and lighterage charges, the increased rates having gone into effect on May 1. The charge applies particularly to "S. to S." (station to station) traffic, which excludes the service of collection and delivery. The increased rates are due primarily to the increased expenses, particularly the higher cost of horses and feed, resulting from the war. The cartage strength of the railways in addition has been seriously depleted by the shrinkage of horses and men.

General News Department

The Boston & Maine announces that liquors will no longer be sold in the dining cars of the road.

The Brotherhood of Locomotive Engineers, at a convention held in Cleveland last week, adopted a resolution advocating a federal law requiring power headlights on locomotives on all steam railroads in the country.

The Illinois legislature has passed a bill authorizing the construction by the state of a navigable waterway from Lockport to Utica, a distance of 65 miles, connecting the drainage canal with the Illinois river and the Mississippi river.

The Chicago & North Western announces that out of 850 passenger trains operated between Chicago and Milwaukee during the month of April 847 trains arrived at the terminals exactly on time, and in the other three instances there was only a few minutes' delay.

A party of Lehigh Valley Railroad officers, including both operating and traffic men, has just returned from a business trip in the west, where they sought to learn at first hand what their patrons in the middle west had to suggest for the betterment of the service. The party visited all the larger cities, and saw, also, prominent western railroad men.

The Pennsylvania Railroad and the Public

[From statement before the Commission on Industrial Relations.]

The policy of publicity which the Pennsylvania Railroad pursues is framed with a view to keeping the public advised of the company's activities; in short, to take the public into its confidence. The company started its publicity work some nine years

mation in Philadelphia, and then to send copies to the papers throughout the system. But it became obvious that the local representative of the company in each city must of necessity know what was being given to the papers and the plan was developed whereby representatives were appointed to deal with the press in each place, the general superintendent, the superintendent, or the agent.

The road never pays any newspaper anything to print anything as news, or as an editorial, regarding its service. The papers can do as they wish; publish or throw in the waste basket. What they do does not affect in the slightest the attitude of the company toward them.

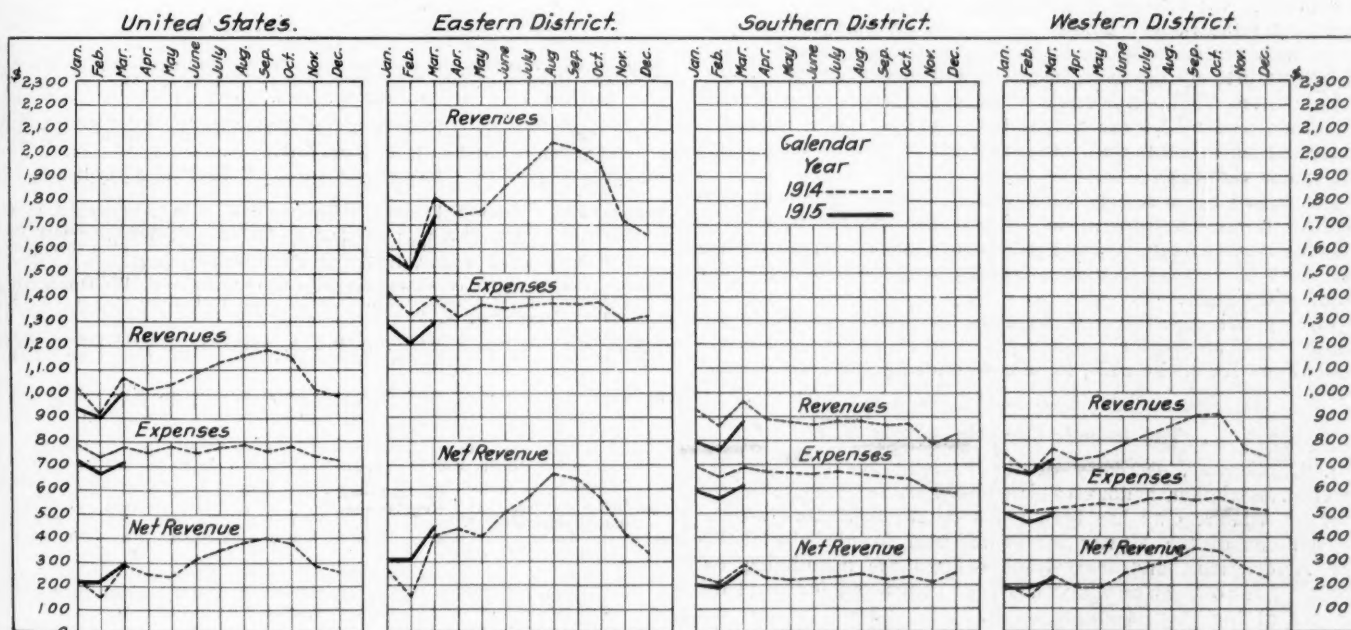
The Pennsylvania Railroad is just beginning its publicity work. It is continually trying to find new angles from which to approach the public with information about the work the railroad is trying to do.

Summary of Revenues and Expenses of Steam Roads

The Bureau of Railway Economics' summary of revenues and expenses and comments thereon for March, 1915, are as follows:

Net operating income of the railways of the United States for March increased \$3 per mile, or 1.2 per cent, as compared with March, 1914. This increase was due not to an increase in gross earnings but to reductions in expenses, which have been effected throughout the country, but particularly in the East. In March, 1914, net operating income per mile was 2.9 per cent greater than in March, 1913.

Total operating revenues amounted to \$231,499,126, a decrease



Monthly Revenues and Expenses per Mile of Line in 1914 and 1915

ago by first inaugurating a plan of full publicity regarding all accidents on its lines. Since that time the work has been extended to cover the activities of all departments.

The road makes an effort to see to it that what the press publishes about the railroad shall not consist of complimentary notices about the railroad or its officers, but real facts of consequence. If the road is going to be able to work out its problems properly, it has got to be believed in. It must get imbedded in the public mind that it is doing its work as best it can and doing it, in the main, exceedingly well.

The first plan of distribution worked out was to give infor-

from 1914 of \$15,923,105. Operating expenses were \$164,731,902, a decrease of \$16,966,890. Net operating revenue amounted to \$66,767,224, an increase of \$1,043,785. Taxes amounted to \$11,133,218, a decrease of \$187,273. This left \$55,581,122 for net operating income, available for rentals, interest on bonds, appropriations for improvements and new construction, and dividends. Operating revenues per mile of line averaged \$1,012, a decrease of 7.3 per cent; operating expenses per mile averaged \$720, a decrease of 10.2 per cent; net operating revenue per mile averaged \$292, an increase of 0.7 per cent, while taxes per mile were \$49, a decrease of 2.5 per cent. Net operating income per mile

was \$243, an increase of 1.2 per cent. Railways operating 228,661 miles of line are covered by this summary, or about 90 per cent of the steam railway mileage in the United States.

Total operating revenues of the eastern railways per mile of line decreased 5.9 per cent as compared with March, 1914, operating expenses decreased 11.0 per cent, net operating revenue increased 12.7 per cent, taxes increased 0.6 per cent, and operating income increased 15.6 per cent.

Total operating revenues of the southern railways per mile decreased 11.9 per cent, operating expenses decreased 12.3 per cent, net operating revenue decreased 10.9 per cent, taxes decreased 4.7 per cent, and operating income decreased 12.0 per cent.

Total operating revenues of the western railways per mile decreased 6.5 per cent, operating expenses decreased 7.8 per cent, net operating revenue decreased 3.8 per cent, taxes decreased 4.5 per cent, and operating income decreased 3.8 per cent.

The nine months of the current fiscal year show a decrease in total operating revenues per mile of line of 7.8 per cent as compared with the corresponding period of the preceding year, a decrease in operating expenses per mile of 9.8 per cent, a decrease in net operating revenue per mile of 2.8 per cent, and a decrease in net operating income of 3.0 per cent.

The net operating income per mile increased 6.0 per cent in the East, decreased 19.5 per cent in the South, and decreased 4.0 per cent in the West.

March net operating income per mile was 1.2 per cent greater in 1915 than in 1914, 3.6 per cent greater than in 1913, 6.7 per cent less than in 1912, and 9.1 per cent less than in 1911.

Railway Signal Association

The May meeting of the Railway Signal Association, held in New York City last week (see page 1132), finished its business on Thursday by discussing the four additional committee reports named in the program.

Committee VI, on standard designs, presented four new and four revised drawings. The revisions include a terminal block, a clamp for the base of ground mast signals, a blade for upper quadrant signals and a binding post. The new plans show tang ends with screw jaws, an adjusting crank and assembly, and switch adjustment brackets, insulated and non-insulated.

Committee VIII, on electric railway and alternating current signaling, presented specifications for reactors. These were discussed at some length and members made numerous suggestions for minor changes.

Committee X, on storage battery and charging equipment, presented, in revised form, a set of specifications for nickel-iron alkaline storage batteries, and gave data showing typical figures for costs of various methods of charging storage batteries for automatic signals.

The special committee on lightning protection presented revised specifications for vacuum-gap and air-gap lightning arresters and for choke coils, to be used with lightning arresters.

The Atlantic City Conventions

J. D. Conway, secretary of the Railway Supply Manufacturers' Association, announces that 67,680 sq. ft. of space on the Pier at Atlantic City has been taken by the exhibitors for the conventions of the Master Mechanics' and Master Car Builders' Associations, and several other firms are negotiating for space. The total space which has been contracted for from the owners of the Pier is 70,000 sq. ft.

All of the entertainment features of the conventions are to be held on the Pier this year. There will be dances on June 9, 10 and 11, the dance on the 11th being a carnival dance, and a vaudeville performance on June 12. The vaudeville performance will be held in the Auditorium, which is directly over the Convention Hall, and which seats 5,000, so that there will be ample room for all members and guests. On Sunday a golf tournament will be held at the Seaview Golf Course.

American Electric Railway Association

After June first the headquarters of the American Electric Railway Association will be located at 8 West Fortieth street, New York. The headquarters were formerly at 29 West Thirty-ninth street.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 2-5, 1916, Atlanta, Ga.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, 455 Grand Central Station, Chicago. Next meeting, July 21, 1915, Milwaukee, Wis.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next meeting, October 21-23, 1915, Boston, Mass.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, East St. Louis, Ill.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, August 19-20, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York. Annual convention, October 4-8, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. G. McConaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

AMERICAN RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago. Annual meeting, July 13-16, 1915, Hotel Sherman, Chicago.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 19-21, 1915, Detroit, Mich.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 21-23, 1916, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 9-11, 1915, Atlantic City, N. J.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—Owen D. Kinsey, Illinois Central, Chicago. Annual meeting, July 19-21, 1915, Hotel Sherman, Chicago.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June 22-26, 1915, Hotel Traymore, Atlantic City, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Next spring meeting, June 22-25, 1915, Buffalo, N. Y. Annual meetings, December 7-10, 1915, New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, Supt. Timber Preservation, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 18-20, 1916, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, Rooms 1116-8, Woodward Bldg., Washington, D. C. Annual meeting, June 28, 1916, Detroit, Mich.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, 2d Tuesday in October, 1915, New York.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Semi-annual meeting with Master Car Builders' and Master Mechanics' Associations. Annual meeting, October, 1915.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Next meeting, June 22-23, Niagara Falls, N. Y.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Traffic Manager, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1126 W. Broadway, Winona, Minn. Next convention, July 13-16, 1915, Sherman House, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, C. H. & D., Lima, Ohio. Annual meeting, August 17, 1915, Philadelphia, Pa.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next meeting, October 19-21, 1915, St. Louis, Mo.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 14-16, 1915, Detroit, Mich.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 14-16, 1915, Atlantic City, N. J.

NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, 349 Peoples Gas Bldg., Chicago. Next convention, March, 1916, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

PEORIA ASSOCIATION OF RAILROAD OFFICES.—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

RAILROAD MEN'S IMPROVEMENT SOCIETY.—J. B. Curran, Erie R. R., 50 Church St., New York. Meetings, alternate Thursdays, October to May. Assembly Rooms of Trunk Line Association, 143 Liberty St., New York.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December, 1915, Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1063 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Next meeting, October 5-7, 1915, Chicago.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Annual meeting, September 14-17, 1915, Salt Lake City, Utah.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, N. Y. C. R. R., Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics' Associations.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Annual meeting, September 14-16, 1915, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., 1134 La Salle St. Sta., Chicago. Annual meeting, September, 1915.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Next meeting, July 15, 1915, Atlanta.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Piedmont Hotel, Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEWARK.—John J. Kautzmann, P. O. Box 238, Newark, N. J. Regular meetings, 1st Monday in month, except July and August, The Washington, 559 Broad St., Newark.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings last Tuesday in month, except June, July and August, Hotel Astor, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Genl. Agt., Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings bi-monthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noontime meetings October to May.

TRAIN DISPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, N. Y. C. R. R., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., East Buffalo, N. Y. Annual meeting, September 7-10, 1915, Chicago.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and Wednesday after 1st Thursday in January, Chicago. Annual meeting, 1st August, generally on other Monday evenings.

Traffic News

The Western Maryland has filed tariffs with the Interstate Commerce Commission, making the fare from Baltimore to Chicago \$16; and Baltimore now has a differential. The standard rate from Baltimore to Chicago is \$18.

The Atchison, Topeka & Santa Fe has put in service seven new package freight cars from Chicago to Arkansas City, Guthrie, Fort Worth, Dallas, Temple and Houston on shortened schedules, giving a third day arrival in Arkansas City, and a four-day schedule to the other points, except Houston, where there is a five-day service.

The Pennsylvania Railroad announces that it will comply with the order of the Public Service Commission of Pennsylvania by making the 100-trip ticket good for a period of one year instead of six months, and all tickets of this character sold since December 14, 1914, will be good for one year, irrespective of the limit of six months, under which they were sold, and this will also apply to tickets for interstate travel.

The Western Classification Committee has filed with the Interstate Commerce Commission supplement No. 6 to classification No. 53, giving the new form of Section 3 of the uniform bill of lading to make it conformable to the Cummins amendment forbidding railroads to limit their liability for loss and damage below the actual value of the goods, which goes into effect on June 2. The new Section 3 in the Western Classification is identical with that published in last week's issue, page 1134, as issued by C. C. McCain, chairman of the Uniform Bill of Lading Committee for the roads east of Chicago and north of the Ohio river. The supplement also contains the new rule 2 of the classification, stating that ratings are conditional upon actual valuations declared by the shippers at time and place of shipment. Where a shipper refuses to declare value at time and place of shipment goods will not be accepted for transportation. The old rule 2 provided that when invoice value is made a condition of the ratings shown in the classification, the shipper must sign a statement declaring that the invoice value of the property does not exceed the value as stated. The supplement also contains amendments to various items in the classification for which ratings are based on value, stating that the actual value of each article is not to exceed certain amounts named, instead of saying that the value of the article is declared by the shipper not to exceed the amount named.

New Transcontinental Rates July 15

Traffic officers of the transcontinental railroads, after a meeting held in Chicago last week, announced their intention of accepting the latest decision of the Interstate Commerce Commission in the transcontinental fourth section cases and putting into effect the rates prescribed on July 15, the date on which the commission made effective its orders in the original fourth section case and the supplemental orders relating to rates to the "back-haul" territory. This puts into effect the system by which rates to western intermediate points are allowed to exceed the rates to coast terminals by fixed percentages from five zones, which was involved in the decision of the Supreme Court sustaining the commission. The order also puts into effect on July 15 the rates covered by the recent application of the railroads for special permission to make low rates to the Pacific coast on articles especially subject to water competition, without correspondingly reducing their rates to intermediate points.

New Passenger Train Service to Pacific Coast

The Chicago, Burlington & Quincy on May 30 put in service seven new passenger trains from Chicago and four from St. Louis to the Pacific coast, including trains leaving Chicago at 10:05 a. m., running west of Denver over the Union Pacific and the San Pedro, Los Angeles & Salt Lake to Los Angeles, and via the Union Pacific and Southern Pacific to San Francisco; a train leaving Chicago at 11 p. m., running over the Union Pacific and the Western Pacific to San Francisco, the Union Pacific and Southern Pacific to San Francisco, and the Union Pacific

and the San Pedro, Los Angeles & Salt Lake to Los Angeles; a train leaving Chicago at 10:10 a. m., in connection with the Northern Pacific west of St. Paul and Minneapolis to Portland, Seattle and Tacoma; a train leaving Chicago at 10:15 p. m., in connection with the Great Northern west of St. Paul and Minneapolis to Portland, Seattle and Tacoma. Two of the trains from St. Louis are for California and two for the North Pacific coast. New service was established also on May 30, by the Wabash, Union Pacific and Southern Pacific, between St. Louis and San Francisco. The Union Pacific has put on three additional trains eastbound and three westbound in connection with the New Burlington and Wabash service, and a new train running between Chicago and Denver via the Chicago & North Western.

Passengers Must Declare Value of Baggage

The various passenger traffic associations are working out the details of the new rules governing the transportation of baggage which will be required under the Cummins amendment. The Interstate Commerce Commission has decided that the law seems clearly to recognize the carrier's right to fix conditions and terms applicable to the transportation of baggage dependent upon the value as declared by the person who offers the baggage for transportation, and the various associations have practically decided to adopt rules, effective on June 15, requiring declaration of value of baggage at the time of checking, with the understanding that where the amount is not known the value is declared to be not in excess of \$100. For smaller stations a baggage waybill has been suggested. For large stations large sheets similar to hotel registers on which passengers may declare the valuation and sign their names, has been proposed. The Trunk Line and Southeastern Passenger Associations have already adopted rules and regulations requiring declarations of value by passengers. Most of the trunk lines are expected to apply these rules also to intrastate shipments. The Central, Eastern, Canadian and New England Associations are expected to adopt rules substantially similar to those adopted by the Trunk Line Association. The Western Passenger Association and the Transcontinental Passenger Association still have the rules under consideration, as there are many details to be settled. When the passenger declares a greater value than that which the railroads will carry free under their rules, there will be an additional charge at the rate of 10 cents for each \$100 or fraction thereof, above such maximum value.

The Pennsylvania has issued a circular prescribing the new rules necessary to insure compliance with the law and fixing 10 cents as the charge for each \$100 value beyond \$100 for the baggage of each adult passenger. The circular says:

"Carriers cannot limit their liability for loss or damage which may arise through negligence or carelessness unless the carrier obtains from each owner or shipper of baggage a signature in writing. . . . Baggage masters [on trains] must not check baggage to interstate points unless they are able to secure a declaration of value, and must not check baggage of excess value beyond the end of their runs, nor to points where there are no agents. All declarations of value will be delivered with baggage to agent at destination, with instructions to collect proper charges for excess value, if any.

"Each declaration of value must be dated by office stamp or in writing, and the same be carefully preserved at the station for ready reference for a period of six years.

"In the many cases of baggage left behind by passengers, any agent asking that same be forwarded must state in his letter or telegram that he has obtained certification of value, and name the amount. Baggage will then be forwarded under C. O. D. charges for excess value, if any. It must be borne in mind that to obtain certification of value of baggage, and issue checks therefor, in some cases and not in others, would be unlawful, and that if, for any reason, this certification cannot be obtained covering any piece of baggage, then in such cases it must not be checked.

"Transfer companies checking baggage will be instructed that they must obtain a declaration of value and attach 'stop check' to baggage check showing such value, for the information of the station agent, who will then compute charges for excess value, if any, and forward C. O. D. the same as in the case of excess weight of baggage.

". . . In the case of baggage checked between intrastate points no declaration of value will be required."

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Rates on Lumber from Norman, N. C.

Snow Lumber Company v. Raleigh, Charlotte & Southern et al. Opinion by the commission:

The commission finds that the rates on lumber from Norman and Ellerbe, N. C., to points in Virginia, West Virginia and various states north thereof are not unreasonable or prejudicial. Complaint dismissed. (33 I. C. C., 587.)

Rates on Salt from Milwaukee

Petit Salt Company v. Chicago, Milwaukee & St. Paul et al. Opinion by the commission:

The rates on salt in carloads from Milwaukee to trans-Mississippi points on the Chicago, Burlington & Quincy are not found to be unreasonable or discriminatory as compared with the rates from Chicago to the same points. (33 I. C. C., 590.)

Minimum Weights on Lumber

Funk Lumber Company v. Baltimore & Ohio Southwestern et al. Opinion by the commission:

The commission finds that the minimum weights on lumber in mixed carloads of 30,000 lb., in cars less than 36 ft. in length and of 34,000 lb. in cars of 36 ft. or more, for shipments from Ohio and Mississippi river crossings to central freight association and trunk line territories are not unreasonable or discriminatory. (33 I. C. C., 511.)

Rates on Lumber from Mackland, La.

Lumbermen's Association of New Orleans v. Morgan's Louisiana & Texas. Opinion by the commission:

An export rate of 8 cents per 100 lb. on lumber and articles taking lumber rates to New Orleans, La., from Mackland, La., and other stations on defendant's Alexandria branch line between Mackland and Opelousas, is found unreasonable to the extent that it exceeds 7 cents. Reparation is denied. (33 I. C. C., 516.)

Automobiles Not Emigrant Movables

L. G. Ochsenreiter v. Atchison, Topeka & Santa Fe et al. Opinion by the commission:

The commission finds that the provisions of defendants' tariffs excluding automobiles from the application of rates provided for emigrant movables is not unreasonable. The evidence is not sufficiently definite to permit a finding with respect to the non-inclusion of gasoline engines with emigrant movables. Complaint dismissed. (33 I. C. C., 518.)

Fourth Section Application Denied

Cullman Commercial Club v. Louisville & Nashville. Opinion by Commissioner Meyer:

The commission finds that the maintenance of higher class and commodity rates from New Orleans, La., to Cullman, Ala., a point intermediate to Decatur, Ala., than are contemporaneously maintained to Decatur, is discriminatory against Cullman. (33 I. C. C., 634.)

Southern Pacific Ownership of Associated Oil Company's Steamers

Opinion by Commissioner Clark:

The Associated Oil Company, a majority of the stock of which is owned by the Southern Pacific, operates seven oil steamers from Monterey, Gaviota and Port Costa, Cal., to San Francisco, Linnton, Ore., Everett and Seattle, Wash., Honolulu, Hawaii, and ports of Alaska. The commission refuses to grant the petition of the carrier to retain its interest in the boats operating to Oregon and Washington, for the reason that although the Southern Pacific does not reach these points over its own rails, it participates in joint rates to them.

On the other hand, it holds that unless the Southern Pacific

participates, by its rail lines, or in connection with other lines, in transportation of oil from California points to a port for transshipment to Alaska, the continued ownership and operation of its oil steamers between the California ports and ports of Alaska, transporting only oil destined to Alaska, will not be in violation of law.

It also grants the petition of the carrier to retain its interest in the oil steamers operating to Hawaii. (34 I. C. C., 77.)

Rates on Roofing Paper to Oklahoma Points

Hooker-Hendrix Hardware Company et al. v. Missouri, Kansas & Texas et al. Opinion by the commission:

The commission finds that the carload rates on prepared roofing paper and building paper from East St. Louis, Ill., St. Louis, Mo., and Kansas City, Mo., to Muskogee, Tulsa and McAlester, Okla., are unreasonable. Rates for the future are prescribed as follows: From St. Louis and East St. Louis, to Muskogee, 37 cents; to Tulsa, 38 cents and to McAlester, 40; Kansas City, to Muskogee, 26 cents; to Tulsa, 27 cents, and to McAlester, 29 cents. Reparation awarded. (34 I. C. C., 3.)

Rates on Coal from the Crooksville District

San Toy Coal Company v. Akron, Canton & Youngstown, et al. Opinion by Commissioner Harlan:

The commission finds that the rates on bituminous coal in carloads from San Toy, Ohio, and other points in the Crooksville coal district to Chicago and to points in Illinois, Indiana and Michigan discriminate against shipments from the mines of the complainant and others located in the same district in favor of mines located in the middle district of Ohio and defendants are required to remove the discrimination. The rates from San Toy and other points in the Crooksville district to Lake Erie ports for transshipment are not shown to be unreasonable. (34 I. C. C., 93.)

Notice of Arrival of Consignment

Ohio Iron & Metal Company v. Elgin, Joliet & Eastern. Opinion by the commission:

The defendant mailed a notice of the arrival of a car of scrap iron at Chicago Heights, Ill., which was never received by the consignee. As a result the car was held for some time and demurrage charges of \$48 imposed. The commission finds that the carrier's duty was performed when it placed the notice in the mail and that the demurrage charges were properly assessed. (34 I. C. C., 75.)

Lumber Rates to Sioux City, Ia.

In re lumber rates from points in Arkansas and other states to Sioux City, Iowa. Opinion by Commissioner Hall:

The commission finds that the carriers have failed to justify a proposed increased rate of 30 cents a 100 lb. on yellow-pine lumber in carloads from the producing territory west of the Mississippi river, generally described as the southwestern blanket, to Sioux City and a rate of 29 cents from the territory lying north of this blanket. The present rate from both territories is 28 cents. (34 I. C. C., 102.)

Complaints Dismissed

Streever Lumber Company v. Chicago, Milwaukee & St. Paul et al. Opinion by the commission:

The reasonableness of a charge of \$40 for feeding, watering and resting a carload of horses at Schenectady, N. Y., is found not to be within the jurisdiction of the commission. (34 I. C. C., 1.)

A. P. Brantley Company v. Atlantic Coast Line. Opinion by the commission:

The commission finds that the rates on sea-island seed cotton from points in northern Florida to Blackshear, Ga., are not unreasonable. (34 I. C. C., 21.)

Blackburn-Warden Company et al. v. Illinois Central et al. Opinion by the commission:

The commission finds that the double first-class rating under southern classification for grapes in baskets in less than carloads is justified. (34 I. C. C., 58.)

Parlin & Orendorff Company v. Illinois Central et al. Opinion by the commission:

The commission finds that the discrimination at present existing against Canton, Ill., in favor of Peoria, in the rates on agricultural implements in carloads to local points on the Illinois Central in Kentucky, Tennessee and Mississippi is not undue. The commission does not decide the question of reasonableness of rates from Canton because of a readjustment which is now under way. (34 I. C. C., 90.)

Otto Jaeger v. Ann Arbor et al. Opinion by the commission:

The complainant purchased a mileage book entitling him to 1,000 miles of transportation over defendants' lines. One of the conditions on which the book was sold provided that if the cover was presented to the proper bureau within 18 months from date of issue a refund of \$5 would be made to the purchaser. Complainant lost his book and did not find it in time to present it within the time limit, and when he did finally present it to the defendants in accordance with their tariff regulations, refund was refused. The commission finds that this regulation is not unreasonable. (34 I. C. C., 28.)

Rates on Motorcycles to the Pacific Northwest

Ballou & Wright v. New York, New Haven & Hartford et al. Opinion by the commission:

The commission finds that certain rates charged for the transportation of motorcycles in carloads from Armory, Mass., to Portland, Ore., and Seattle, Wash., were unreasonable to the extent that they exceeded the first-class rates contemporaneously in effect. It also awards reparation, holding that where a shipper has paid an excessive rate he may recover as reparation the difference between the rate paid and what would have been a reasonable rate at the time, even though the freight charges were added to the selling price of the article transported. (34 I. C. C., 120.)

Reconsignment

Reeves Coal Company v. Chicago, Milwaukee & St. Paul. Opinion by the commission:

The complainant ordered a shipment reconsigned, provided the lowest rate between original point of origin and final point of destination would apply. Reconsignment was effected and lawful charges, higher than those which would have accrued at the lowest rate from point of origin to final destination, were collected. The commission finds that this case does not differ materially from one involving merely a misquoted rate and dismisses the complaint. (34 I. C. C., 122.)

Ex-Lake Grain to Middletown, Conn.

Meech & Stoddard, Inc., v. Grand Trunk Railway of Canada et al. Opinion by the commission:

To meet competition from Buffalo defendants maintain joint through rates on ex-lake grain from Georgian Bay ports to numerous points in New England. Middletown, Conn., is a similarly situated point and competes with the other points involved in the purchase and sale of grain and grain products, but defendants refuse to extend these rates to Middletown on the ground that the rates are unremunerative and that they desire not to enhance their losses. The commission finds that by following this policy the defendants discriminate against Middletown and it is ordered that this discrimination be removed. (34 I. C. C., 39.)

Fitting Cars for Grain Shipments

National Council of Farmers' Co-operative Associations v. Chicago, Burlington & Quincy et al. Opinion by Commissioner Clark:

The shippers of grain owning elevators at country stations in Illinois, Iowa, Minnesota, Nebraska, Kansas, North Dakota and South Dakota, allege that the defendants fail to furnish cars in suitable condition for the transportation of grain in bulk, and ask that they be required either to furnish cars suitable in all respects for carrying this traffic or that they make an allowance to shippers for work done and materials furnished to prepare the cars for loading.

The commission holds that it is the duty of the carriers to

furnish cars suitable to transport in safety traffic which they hold themselves out to carry, and that this duty is not fulfilled when a carrier furnishes a car, upon reasonable request of a shipper, which requires repairing to prevent leakage of grain in transit. It is also held, however, that it is not unreasonable to expect shippers to do a limited amount of cleaning or to make minor and inexpensive repairs on such cars and that it would be impracticable to fix by order any allowance that should be paid shippers for labor performed or materials furnished. The suggestion is made that carriers specify in their tariffs what they will furnish in the way of materials, which must be uniform and adequate.

The carriers' practice at terminal points with reference to preparing cars for loading grain in bulk is not found to be discriminatory against complainant's members. Complaint dismissed. (34 I. C. C., 60.)

STATE COMMISSIONS

The State Corporation Commission of Virginia has authorized the New York, Philadelphia & Norfolk to advance its passenger rates on June 10 from two cents a mile to two and one-half cents.

The New York Public Service Commission, Second district, having received inquiries from all quarters of the state, says that the "auto-bus law," which has been in effect for the last two years, has been repealed by the recent enactment of the jitney bus law, and that it is no longer necessary for persons and corporations desiring to operate auto bus lines on state highways to come to the commission for certificates of approval. It will be necessary, however, for all persons and corporations owning or operating state routes, bus lines or motor vehicles carrying passengers for a fare of fifteen cents or less, on any street, in any city, except New York, to procure first the consent of the local authorities and next a certificate of convenience from the Public Service Commission.

COURT NEWS

The United States District Court at St. Paul has issued a temporary injunction restraining the Arkansas Railroad Commission from putting into effect the two-cents-a-mile passenger rate, and the roads are allowed to charge three cents pending the final decision.

The Supreme Court of Appeals of West Virginia has issued a mandamus requiring the Baltimore & Ohio to comply with the order of the State Public Service Commission, forbidding an advance in passenger rates from two cents a mile to two and a half cents, no action to be taken until the Public Service Commission can consider the application presented by the road for authority to make the increase.

Infant Trespassers

A nine-year-old girl and her eleven-year-old brother had been sent by their mother to pick coal on the tracks of the Baltimore & Ohio. They entered the tracks at a crossing where the company's watchman was stationed and were seen by him. They commenced picking coal when about 200 ft. from the crossing, near a standing freight train. On the approach of another train they, not having sufficient time to go around the standing cars, stood with their backs against them, and while in this position the girl was struck by or drawn under the passing train, receiving injuries for which suit was brought. The Pennsylvania Supreme Court holds that the children were trespassers and no actionable negligence on the part of the company had been shown.—*Lumis v. B. & O. (Pa.)*, 93 Alt., 952.

Delivery of Livestock on Private Tracks

In an action by a Nashville stockyard company it was alleged that the railroads deliver, on the plaintiff's spur track, all kinds of freight, except livestock, which they refused to so deliver, insisting that stock must be first delivered to the Union Stockyards, following which they would deliver cars to the plaintiff's place on receipt of a switching charge of \$3. This refusal was alleged to be arbitrary, and illegal, and to be because of a con-

tract with the Union Stockyards, by the terms of which the carriers made these yards an exclusive depot in Nashville for livestock. The defendants admitted the existence of the agreement. It was held by the Tennessee Supreme Court that the statute prohibiting the giving of undue preferences, etc., does not require the carrier to make deliveries of livestock shipments in carload lots at private stockyards maintained by the consignee. The company's agreement with the Union Stockyards to make all such deliveries at that company's yards at the carrier's expense was valid, because the nature of the traffic, the necessity for quarantine, and the danger and delay which would be caused by extra switching thereby made necessary was sufficient to justify a different rule from that applied to inanimate freight, which the carrier must deliver on a private track.—*Smith v. L. & N. (Tenn.)*, 175 S. W., 557.

Private Crossings—Duty as to Construction

A Nebraska railroad company, when it obtained its right of way through a farm, constructed an adequate private crossing at grade, under an agreement with the owner of the farm, and maintained it for about 27 years without injury to any person. During that time there was no substantial change of physical conditions. The present owner of the farm now insists that the company construct for him an overhead crossing at a cost of \$1,000 and with a heavy maintenance charge. The State Railway Commission made an order requiring the company to construct the overhead crossing desired. The Supreme Court holds the order to be oppressive and unjust. Moreover, to require the company to construct such a crossing would discriminate unjustly in favor of the owner of the farm and against all other persons similarly situated. The commission's order was reversed.—*Postle v. C. B. & Q. (Neb.)*, 152 N. W., 379.

Chicago Switching Rates—Lowery Tariff

The railroads entering Chicago agreed as to through freight rates where one company brought goods to the city and they were there switched by the others. The Illinois Railroad and Warehouse Commission's rates having been suspended, it entered an order continuing such agreed rates until they should be changed by agreement of the parties or by hearing before the commission. The statute authorizes the commission to establish through rates when necessary for the accommodation of the public, provided they do not give one road an undue advantage over another. An appeal from an order requiring the C. M. & St. P. to abide by the agreed rates, the Illinois Supreme Court holds that the order is valid. The establishment of the rates agreed on (known as the Lowery tariff) was not an appropriation of the company's terminal facilities without due process of law, for the entire city could not be regarded as a single terminal point.—*C. M. & St. P. v. State Public Utilities Commission (Ill.)*, 108 N. E., 737.

Roundhouses—Sufficiency of Construction

A hostler, rated as an engineer, in the employ of an interstate railroad company, tried to board an engine as it was passing through the doorway of a roundhouse and was caught between the tender and the doorjamb and killed. In an action for his death the United States Circuit Court of Appeals for the Second Circuit holds that the company was not guilty of negligence in failing to provide a safe place to work, as the doorway, while narrower than those in some of the more recently constructed roundhouses of the road, was sufficient for all ordinary conditions, and the company could not be held responsible because the hostler saw fit to try to mount his engine as it was about to pass through the door. His duties did not make it necessary for him to do so, and no superior officer directed him, either then or at any other time, to do such a foolhardy thing; there was no emergency calling on him to do as he did. The court held the case to be governed by *New York Central v. Dailey*, 179 Fed., 289, decided in 1910. In that case a dead engine with no air to operate the brakes came in and was handed over to a hostler. A co-employee with another engine kicked it into the roundhouse from the turntable. It was given such speed that the hostler was afraid it would go through the building, and started to jump off to block the wheels, when he struck the post between the stalls and was injured. There was a clearance between the engine and

post of about eleven inches. The court there held that the company was not chargeable with negligence because the space was not greater, the construction being safe under any circumstances to be reasonably anticipated.—Hogan v. New York Central.

Recovery for Mental Suffering

Intending passengers were compelled, because a train properly flagged did not stop, to walk some distance in the rain so as to take another train to their destination. They became ill as a result of the wetting, and were unable to attend the funeral of a relative. In an action for damages the Arkansas Supreme Court holds that damages for mental anguish in not being able to attend the funeral were not recoverable. There was not such causal connection between the physical injury and the mental anguish as to make the railway liable in damages for both. Chicago, R. I. & P. v. Mizell (Ark.), 175 S. W., 396.

Trackage Charges

The Minneapolis & Rainy River operates a number of connecting stub lines, the roadbed and ties of which are owned by a lumber company. It owns the rails and fasteners; it laid the rails, and maintains the tracks and roadbed in condition. It is in exclusive control as a common carrier. It maintains a distance mileage tariff for freight originating on the stub lines and consigned to Deer River, the same as from points on its main line to Deer River. It exacts a trackage charge of one dollar a car, in addition to its published tariff rates, for cars originating on the stub lines, except those of the lumber company, and pays this money to the lumber company. For such charges it renders no service. The Minnesota Supreme Court holds that such charge is invalid, and that shippers, paying involuntarily, are entitled to recover it. McCallum v. Minneapolis & R. R. (Minn.), 151 N. W., 974.

Stipulation As to Manner of Delivery

A bill of lading provided that, when goods were consigned to a station where the carrier had no agent, the carrier might, regardless of the weather, deposit the goods on the platform, whether there was any one there to receive them or not. Goods sent by a freight train which was 50 minutes late in arriving, were deposited in a warehouse, one of the keys to which, for the convenience of consignees, was, by recognized local custom, left with a householder in the vicinity. The Missouri Court of Appeals, in an action for the unexplained loss of the goods, held that the delay in arrival did not entitle the consignee to notice, as it did not appear that the train would have been met if on time, and the placing of the goods in the warehouse was not a conversion rendering the company liable for their loss. Morrison T. & E. Co. v. Illinois Central (Mo.), 175 S. W., 220.

Relief Contracts—Statutory Provisions

A contract between a railroad employee and a relief association, maintained by the railroad company and associated corporations, provided for the payment by the employee of monthly dues to be deducted by the company from his wages, stipulated for benefits in the event of sickness or injury or accidental death, and declared that acceptance of benefits should operate as a release of all claims against the company. The Indiana Appellate Court holds that the contract is void under Burns' Ann. St., 1914, section 5308, declaring that no railroad company may maintain a relief association, the rules of which require any employee becoming a member to surrender any rights or damages against the company for personal injuries or death, and the employee, who had never received any benefits from the association, was entitled to recover the part of the wages retained by the company. Acton v. Baltimore & O., S. W. (Ind.), 108 N. E., 535.

Regular Train

In an action for damages for unreasonable delay in transporting livestock it appeared that the railroad company had operated a stock train, designated as an extra train, on Sundays, Tuesdays and Thursdays of each week for about 10 years. Occasionally the train was not run on Thursdays for want of freight, but that was exceptional. However, evidence that reports were gathered from all the stations as to the amount of freight to be trans-

ported showed that the train was not operated unless there appeared to be sufficient freight to warrant making it up. A station agent contracted to furnish the plaintiff a car for the extra train on a Thursday, but the train did not run. The Iowa Supreme Court held that it was a question for the jury whether the extra train was a regular train and held out to shippers, as such, and, their answer being in the affirmative, the contract was not one for special service prohibited by the Interstate Commerce act. J. W. Stewart & Son v. Chicago, R. I. & P. (Iowa), 151 N. W., 485.

Safe Appliances—Couplers—Case for Jury

A brakeman, employed by a railroad company engaged in interstate commerce, inserted his arm between an engine tender and the car next back of it to make an adjustment of the couplers, as they would not work automatically by impact. His arm was crushed, necessitating amputation, for which he sued and recovered damages. The New Jersey Court of Errors and Appeals holds that, under the safety appliances act, the duty of the company to provide couplers which would work automatically by impact was an absolute one; and from the fact that the couplers did not so work on the given occasion, it was inferable that the company had failed to comply with the standard raised by the act. Therefore, under the federal employers' liability act, the employee was to be held not to have been guilty of contributory negligence, nor to have assumed the risks of the employment, and the company was not entitled to a directed verdict, but the case was properly submitted to the jury, which returned a verdict for the plaintiff. Parker v. Atlantic City (N. J.), 83 Atl., 574.

Ambiguous Order As to Rates—Contempt

An order of the Michigan Railroad Commission fixing rates for carriage of logs, put into effect on February 19, 1915, read: "Above rates to apply when the manufactured product is reshipped via the D. & M. And when not to be so reshipped, the railway company will collect in addition to the above rates 50 cents per 1,000 ft. But if later reshipment is made over the D. & M., the company will refund to such shipper the 50 cents per 1,000 ft. collected." In proceedings by the railroad commission against the D. & M. to adjudge that company guilty of contempt for failure to comply with the order of court commanding it to put the rates in effect, the Michigan Supreme Court holds that the commission's order is sufficiently ambiguous to permit the company to exact the extra charge in the first instance and rebate only on proof that the manufactured product of the logs shipped in had been shipped out over its line, without being in contempt of the order of court. Michigan R. R. Commission v. Detroit & M. (Mich.), 152 N. W., 193.

Crossing Other Railroads—Permission of Commission

Illinois Laws, 1889, p. 233, section 1, as amended by laws, 1907, p. 475, provides that any railroad company desiring to cross the track of any other railroad company shall apply to the Railroad and Warehouse Commission for permission, and the commission, after investigation, shall give a decision as to the place where and the manner in which the crossing shall be made, provided that it shall be at such place and made in such manner as will not necessarily impede or endanger the travel on the railroad to be crossed. The Illinois Supreme Court holds that this provision does not repeal Railroad Act 1872, section 19, authorizing a domestic railroad company to cross the tracks of another railroad company. It merely has the effect of withdrawing from the company seeking to make the crossing the arbitrary power of selecting the place and manner and to confer upon the commission the power to prescribe such place and manner. It also withdraws from the companies the power to enter into an agreement as to the place and manner of crossing, and imposes upon the commission the duty, in every instance, of determining at what place and in what manner the crossing shall be made. But the commission cannot withhold its permission to cross at the place and in the manner selected by the company desiring to make the crossing unless it prescribes some other place where or manner in which the crossing may be made. An order of the commission granting the right to cross the tracks of another company will not be disturbed, unless it be shown that the commission abused its discretion in its determination. Railroad & Warehouse Commission v. Peoria & P. U. (Ill.), 108 N. E., 655.

Railway Officers

Executive, Financial, Legal and Accounting

Adam Darling has been appointed claim agent of the Denver & Rio Grande, with headquarters at Denver, Colo., succeeding C. S. Mitchell, resigned.

T. A. Martin, general storekeeper of the Oregon Short Line at Pocatello, Idaho, has been appointed assistant auditor, with headquarters at Salt Lake City, Utah.

W. S. Martin, general manager of the Denver & Rio Grande at Denver, Colo., has been elected president of the Union Railway, with headquarters at Memphis, Tenn., succeeding J. L. Lancaster, resigned.

William S. Trowbridge, whose appointment as auditor of the Boston & Albany, with headquarters at Boston, Mass., has already been announced in these columns, was born on January 11, 1880, at Pawling, N. Y. He attended high school until June, 1895, and the same month entered the service of the New York Central & Hudson River as a clerk in the accounting department, and subsequently held various positions until he became general bookkeeper. He remained in that position for several years, until his appointment on June 5, 1911, as assistant auditor of the Boston & Albany, which position he held at the time of his recent appointment as auditor of the same road, as above noted.

Operating

John C. Maus has been appointed supervisor of demurrage and weighing of the Illinois Central, with office at Chicago, vice Fred W. Souerbry, resigned to engage in other business.

James Russell, assistant to vice-president of the Denver & Rio Grande, at Denver, Colo., has been appointed general manager, with headquarters at Denver, succeeding W. S. Martin, resigned.

J. M. Cameron, assistant general superintendent of the British Columbia division of the Canadian Pacific at Vancouver, B. C., has been appointed general superintendent of the Alberta division, with headquarters at Winnipeg, Man.

M. A. Mulligan, who was recently appointed acting superintendent of the New York division of the Lehigh Valley, has been appointed superintendent of the same division, with headquarters at Jersey City, N. J., succeeding M. C. Roach, deceased.

D. E. Wilcox, assistant superintendent of the second division of the Denver & Rio Grande at Salida, Colo., has been appointed assistant superintendent of the Salt Lake division, with headquarters at Salt Lake City, Utah, succeeding Roscoe Mahon, deceased.

W. H. Hall, superintendent of telegraph of the Missouri, Kansas & Texas at Denison, Tex., has been appointed general superintendent of telegraph, with headquarters at Denison, and J. Hickman has been appointed superintendent of telegraph, with headquarters at Parsons, Kan.

J. W. Wassum, superintendent of the Spartanburg division of the Southern Railway at Columbia, S. C., has been appointed superintendent of the Columbia division, including Columbia terminals, with headquarters at Columbia, vice G. V. Peyton, resigned, and William Maxwell, trainmaster at Columbia, succeeds Mr. Wassum.

M. V. Hynes, superintendent of the Wellston and Delphos divisions of the Cincinnati, Hamilton & Dayton, at Dayton, Ohio, has been appointed superintendent of the Indianapolis division, with headquarters at Indianapolis, Ind., succeeding R. B. White, resigned to go to the Baltimore & Ohio Southwestern. A. A. Iams, trainmaster at Dayton, succeeds Mr. Hynes, and R. W. Brown, road foreman of engines at Lima, succeeds Mr. Iams.

A. E. Stevens, general superintendent of the Alberta division

of the Canadian Pacific at Calgary, Alta., has been appointed general superintendent of the Eastern division, with office at Montreal, Que., succeeding George Hodge, who has been appointed assistant to the general manager at Montreal. R. G. Edwards has been appointed assistant superintendent of district No. 2, with office at Montreal, succeeding E. J. Melrose, who has been appointed assistant superintendent of district No. 3, succeeding C. W. Lott, transferred as assistant superintendent to district No. 5, with office at Smith's Falls, Ont.

J. C. Hagerty, superintendent of the Baltimore & Ohio Southwestern at Seymour, Ind., has been promoted to general agent on the staff of the general manager of the Southwestern district, with headquarters at Cincinnati, Ohio. E. W. Scheer, superintendent, at Flora, Ill., succeeds Mr. Hagerty, and R. B. White, superintendent of the Indianapolis division of the Cincinnati, Hamilton & Dayton at Indianapolis, Ind., succeeds Mr. Scheer. G. S. Cameron, assistant superintendent in charge of the Cincinnati terminals of the Baltimore & Ohio Southwestern at Cincinnati, Ohio, has been transferred as assistant superintendent to Chillicothe, succeeding E. N. Brown, deceased, and H. H. Broughton, assistant superintendent at Cleveland, has been transferred to Cincinnati, in charge of the Cincinnati terminals.

Traffic

F. R. Smalley has been appointed district passenger agent of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Duluth, Minn.

C. B. Williamson, superintendent of the Chesapeake Western, has been appointed also traffic manager, with office at Harrisonburg, Va., vice C. A. Jewett, resigned to engage in other business.

Frank D. Powell has been appointed commercial agent of the Canada Southern Line, operating over the Michigan Central via Buffalo, N. Y., and the Pennsylvania Railroad and connections, with office at Chicago, Ill., vice L. S. Livingston, transferred.

E. G. Mustain, division freight and passenger agent of the El Paso & Southwestern, at Tucson, Ariz., having been transferred to another department, the office has been abolished. Territory heretofore under his jurisdiction has been assigned to Richard Warren, general agent at El Paso, Tex.

Engineering and Rolling Stock

R. S. Mounce has been appointed general foreman of car repairs of the Erie, with office at Jersey City, N. J., succeeding P. Fox, deceased.

John Dwyer has been appointed superintendent maintenance of way of the Norfolk Southern, in charge of maintenance of track, bridges and buildings, with headquarters at Norfolk, Va.

M. B. McPartland has been appointed master mechanic of the Colorado and Nebraska divisions of the Chicago, Rock Island & Pacific, with headquarters at Goodland, Kan., succeeding E. F. Tegtmeyer, resigned.

G. E. Sisco, assistant engineer of motive power of the Pennsylvania Lines West, at Columbus, Ohio, has been appointed master mechanic, with headquarters at Toledo, Ohio, succeeding J. W. Hopkins, transferred.

E. Keough, roadmaster and assistant trainmaster of the Chicago, Burlington & Quincy, at Aurora, Ill., has been appointed assistant engineer of maintenance of way of the Canadian Pacific Lines East of Winnipeg, with headquarters at Montreal.

O. P. Reese, master mechanic of the Pennsylvania Lines West, with headquarters at Crestline, Ohio, and Pittsburgh, Pa., has been appointed assistant engineer of motive power, in the office of general superintendent of motive power, vice T. R. Cook, resigned.

H. R. Carpenter, engineer of maintenance of way of the Missouri Pacific-Iron Mountain System, has been appointed assistant chief engineer, with headquarters at St. Louis, Mo., succeeding C. E. Smith, resigned. A. F. Dorley, principal assistant engineer, has been appointed engineer maintenance of way, succeeding Mr. Carpenter.

Christopher Thane Sponsel, roadmaster of the Northern Pacific at Mandan, N. D., has been appointed roadmaster at Garrison, Mont., succeeding Frank William Barnes, resigned, and Frank G. Cook, assistant engineer, has been appointed roadmaster, to succeed Mr. Sponsel. John Henry Hayes has been appointed roadmaster at Moscow, Idaho, succeeding Frank Hartman, resigned.

B. Violett, roadmaster of the Chicago, Burlington & Quincy, at Beardstown, Ill., has been transferred to Galesburg, Ill., in the same capacity, succeeding J. A. Sullivan, deceased. J. Emerson, assistant roadmaster at Galesburg, Ill., has been appointed roadmaster at Beardstown, Ill., succeeding Mr. Violett. J. D. Farrington, roadmaster at Council Bluffs, Iowa, has been appointed roadmaster and assistant trainmaster at Aurora, Ill., succeeding E. Keough, resigned. J. S. Miller has been appointed roadmaster at Council Bluffs, Iowa, succeeding Mr. Farrington.

OBITUARY

P. Fox, general foreman of car repairs of the Erie at Jersey City, N. J., died on May 10.

H. W. Cowan, chief engineer of the Colorado & Southern, died at his home in Denver, Colo., on May 29, at the age of 53.

John G. McCullough, vice-president of the Chicago & Erie, died on May 29, at his home in New York. He was born in 1835, at Newark, Del. In December, 1874, he became vice-president of the Panama Railroad, and subsequently became president of the same road. In 1873 and 1874 he served as a director of the Central Vermont. From 1877, to 1883, he was vice-president of the Bennington & Rutland, and later became president of that road. From November, 1884, for several years he served also as president pro tem. of the New York, Lake Erie & Western, and from September, 1890, for over ten years was also president of the Chicago & Erie. From July, 1893, to 1896, he was also receiver of the New York, Lake Erie & Western, and later became vice-president of the Tioga Railroad. At the time of his death he was vice-president of the Chicago & Erie, now a part of the Erie.

RUSSIAN RAILWAYS AND WATERWAYS.—Notwithstanding the war, the Russian government has found it possible to allow a survey for the construction of two large new railways, i. e., for the Achinsk-Minusinsk Railway from the station of Achinsk, on the Siberian Railway to the town of Yeniseisk, from the town of Minusinsk to the village of Grigorievsky, and from Minusinsk to Kuragino, and it is also proposed to build another railway with a total length of 1,150 versts (725 miles) from the station of Krasnoufimsk on the Moscow-Kazan Railway, or one of the near-lying points of this line, to Kostroma, with a branch from Nolinsk to Kotelnich. The Ministry of Ways and Communication has just drafted the grandiose project for a trunk waterway from Ekaterinoslav to Riga. This project embraces almost the entire length of the Black Sea-Baltic waterway, some 1,900 versts (1,200 miles) out of the total length of 2,200 versts (1,375 miles) from Kherson to Riga being included in the new project.

RUSSIA'S IMPORTS OF COAL AND COKE.—The imports into Russia during 1914 of coal across the European frontier amounted to 4,700,000 tons, which compared with the previous year, shows a decrease of 2,820,000 tons, or 37.4 per cent. The deficit falls entirely upon the second half of the year, inasmuch as the first six months of 1914 show an increase compared with the corresponding period of the previous year of 630,000 tons, while the decrease on the second six months amounted to 3,400,000 tons. The imports of coal from different countries were as under:

	1913. Tons	1914. Tons	Decrease. Per cent
England	3,600,000	2,500,000	39.8
Holland	3,250,000	2,000,000	37.5
Austria	89,000	84,000	7.0
Various countries	190,000	200,000	4.0 increase

The imports of coke have decreased still more than those of coal, the imports during 1914 amounting to 530,000 tons, against 960,000 tons in 1913. The decrease consequently amounted to 430,000 tons, or 44.7 per cent, the imports during the second half of last year being quite insignificant.—*Engineering.*

Equipment and Supplies

LOCOMOTIVE BUILDING

THE WESTERN MARYLAND has ordered 15 Mallet type locomotives from the Lima Locomotive Corporation.

THE NEWBURGH & SOUTH SHORE has ordered one superheater Mogul type locomotive from the Baldwin Locomotive Works.

THE YOUNGSTOWN IRON & STEEL COMPANY, Youngstown, Ohio, has ordered 2 standard gage oil-burning locomotives from the H. K. Porter Co.

THE TOLEDO TERMINAL has ordered one superheater Consolidation type locomotive from the American Locomotive Company. This locomotive will have 22 by 28 in. cylinders and 51 in. driving wheels.

THE CHESAPEAKE & OHIO has ordered 24 Mallet type (2-6-6-2) locomotives from the American Locomotive Company. These locomotives will have 22 and 35 by 32 in. cylinders, 56 in. driving wheels and will be provided with superheaters.

CAR BUILDING

THE CHESAPEAKE & OHIO is inquiring for 50 caboose cars.

THE MISSOURI PACIFIC will repair a large number of freight cars.

THE TEXAS & PACIFIC is reported to be inquiring for 500 coal cars.

DARLING & COMPANY, Chicago, are inquiring for prices on 15 tank cars.

THE DELAWARE & HUDSON is in the market for 18 coaches and 6 baggage cars.

THE MISSOURI, KANSAS & TEXAS, reported some time ago as being in the market for 1,200 gondolas, will not purchase any freight equipment this year.

THE UNION TANK LINE has recently exercised an option covering the purchase of 1,000 tank cars from the Standard Steel Car Company. These cars are in addition to the 1,000 cars ordered last December, the option for the additional 1,000 cars having been taken at that time. The specialties for the cars on the new order have already been provided for.

IRON AND STEEL

THE LEHIGH & NEW ENGLAND has ordered 1,700 tons of rails from the Bethlehem Steel Company.

THE CENTRAL RAILROAD OF ARGENTINA has ordered 8,000 tons of rails from the Pennsylvania Steel Company.

THE NEW YORK CENTRAL has ordered 270 tons of bridge material for two bridges to be built at Jersey City from the Fort Pitt Bridge Works.

THE NORFOLK & WESTERN has ordered 5,100 tons of rails from the Carnegie Steel Company, and 3,000 tons from the Pennsylvania Steel Company.

MACHINERY AND TOOLS

THE PENNSYLVANIA RAILROAD is asking bids on four special machines for use in the making of piston valves.

THE SEABOARD AIR LINE is reported to be taking preliminary bids on equipment to replace that damaged recently by fire at its shops.

THE DELAWARE, LACKAWANNA & WESTERN has ordered a steam hammer, a bolt-cutter and one or two other machines, and is taking bids on another bolt-cutter.

Supply Trade News

George C. Wilson, of the Independent Pneumatic Tool Company, Chicago, has been appointed manager of that company's branch at Atlanta, Ga., succeeding F. H. Charbono, who has been transferred to Boston.

J. Drew Allen, northwestern representative of the Taylor-Wharton Steel Company, received a fatal injury while examining the tracks of the Salt Lake City Traction Company, and died on May 16, at the age of 33.

W. D. Waugh, district representative in St. Louis, Mo., of the Kalamazoo Railway Supply Company, Kalamazoo, Mich., has been appointed district representative in charge of the St. Louis office of the Detroit Graphite Company, succeeding Benjamin Randolph, resigned.

The directors of the Baldwin Locomotive Works have postponed action on the semi-annual dividend of 1 per cent on the common stock usually paid at this time. They have, however, declared the regular semi-annual dividend of $3\frac{1}{2}$ per cent on the preferred stock payable July 1.

At the annual directors' meeting of Fairbanks, Morse & Company, recently held in Chicago, C. H. Morse, Sr., retired from the office of president of the company, which he has held for 24 years, and C. H. Morse, Jr., was elected to succeed him. Mr. Morse, Jr., has for a number of years been president of the Fairbanks-Morse Manufacturing Company, Beloit, Wis., and will continue to hold that position. Other officers of the company were re-elected.

Merton A. Peacock has been appointed district sales manager of the Terry Steam Turbine Company, Hartford, Conn., for the territory included in Minnesota, North Dakota and South Dakota, with office at 400 Endicott building, St. Paul, Minn. This arrangement supersedes the previous selling agreement with the Robinson, Cary & Sands Company, St. Paul. The company has also appointed the Hawkins-Hamilton Company, Peoples National Bank building, Lynchburg, Va., as its representatives for Virginia.

Benton C. Rowell, an inventor of numerous mechanical devices for use in railroad operation, and one of the most prominent advocates of automatic train control, died suddenly of heart failure on May 29 at Chicago, aged 58 years. He had made practically a life study of automatic train control. In 1891 he demonstrated his safety stop on the Boston, Revere Beach & Lynn, and in 1893 on the Intramural Railway at the Chicago World's Fair. In 1893 and 1894 the device was installed on the Chicago South Side Elevated Railroad, and in 1894 and 1895 on the Metropolitan West Side Elevated Railroad at Chicago. It was also given a service test on the Chicago, Burlington & Quincy in 1908 and 1909. Mr. Rowell also had numerous patents pending on appliances connected with railroad signaling.

Guy E. Tripp, chairman of the Westinghouse Electric & Manufacturing Company, has been quoted as follows: "The Westinghouse Electric & Manufacturing Company has purchased the property and assets of the Stevens Arms & Tool Company and the Stevens-Duryea Automobile Company, and a company has been incorporated under the laws of Massachusetts to own and control these two properties. This company will be known as the New England Westinghouse Company, and all of its \$2,000,000 capital stock is owned by the Westinghouse Electric & Manufacturing Company. The company has no bonded debt. These two companies were purchased by the Westinghouse as a result of the order for 1,000,000 rifles which we have taken from the Russian government. This large order will be filled entirely from the two Stevens companies that have been purchased. It is not the intention of the Westinghouse Electric & Manufacturing Company to make any alterations whatever to its present plants in connection with this rifle order. In other words, it is to be filled by companies which are thoroughly experienced in the manufacture of this class of product, so that there are few uncertainties in connection with the transaction."

C. E. Smith, recently assistant chief engineer of the Missouri Pacific-Iron Mountain System, has opened an office as consulting

engineer at 2075 Railway Exchange building, St. Louis, Mo. He will engage in general railway and municipal practice, with special attention to valuations, terminal problems, grade crossing eliminations, bridges and miscellaneous structures. Mr. Smith has had a varied experience in all branches of civil engineering of about 17 years. He was graduated from the Massachusetts Institute of Technology in 1900 in civil engineering, and during vacations worked as rodman for the New England Railroad, and also as assistant city engineer of the cities of Putnam and Willimantic, Conn., which position he also held from June, 1900, to November, 1900. In November, 1900, he entered the service of the New York, New Haven & Hartford as bridge engineer at New Haven, which position he held for three years. From November, 1903, to March, 1904, he was with the bureau of yards and docks of the United States Navy Department at Washington, D. C., and in March, 1904, he returned to railroad service as assistant bridge engineer of the Lake Shore & Michigan Southern at Cleveland, Ohio. From March, 1905, to December, 1906, he was text book writer and instructor for the International Correspondence Schools, Scranton, Pa. From December, 1906, to July, 1907, he was with the United States Geological Survey as field assistant at Washington, D. C., San Francisco, Cal., and St. Louis, Mo., engaged in investigating and reporting the effects of the fire and earthquake on San Francisco buildings and reporting the results of work accomplished at testing laboratories at the World's Fair grounds, St. Louis. In August, 1907, he became connected with the Missouri Pacific as bridge engineer, and later was promoted to assistant chief engineer, in which position he was in charge of all bridge and grade crossing work on the system, and during the last two years had full charge of engineering work of every nature, including tracks, bridges, grade crossings, depots and other buildings.

TRADE PUBLICATIONS

BRICK ARCHES.—The American Arch Company, New York, has issued a booklet entitled "Uncle George's Primer," made up of questions and answers pertaining to the use and construction of the locomotive brick arch.

AIR METERS.—A four-page folder has been issued by the New Jersey Meter Company, Plainfield, N. J., dealing with the toolometer, a recently developed form of air-blow meter. This device is adapted to checking the amount of compressed air used with the various types of portable pneumatic tools.

SALT LAKE ROUTE.—The passenger department of the San Pedro, Los Angeles & Salt Lake has recently issued a very attractive folder containing views and descriptions of Yellowstone and Glacier National Parks. The booklet gives also detailed information relative to tours through these parks.

WIRING.—The Fargo Manufacturing Company, Inc., Poughkeepsie, N. Y., has recently issued catalog No. 800, relative to its type A and B connecting devices for electric wiring. The catalog is well illustrated with sectional drawings and engravings showing the construction of the various types of connectors.

WAGON AND TRUCK LOADERS.—This is the title of book No. 210 of the Link-Belt Company, Chicago, relative to a line of portable loaders for use in handling such material as coal, sand, stone, gravel and other loose material from storage piles into wagons, trucks or cars. The book has 47 pages and is profusely illustrated.

RIVETERS.—Catalog No. 3 of the Vulcan Engineering Sales Company, Chicago, deals with a line of pneumatic riveters manufactured by the Hanna Engineering Works, Chicago. These machines are of various types and sizes, the special feature of the line being the toggle motion by which the power is transmitted to the ram.

BOILER WATER TREATMENT.—The Bird-Archer Company, New York, has recently issued a 40-page pamphlet dealing with boiler maintenance and discussing its system of polarized metallic boiler chemicals for locomotive use. A portion of the book is devoted to a brief treatise on locomotive boiler maintenance prepared by a general boiler inspector.

ARCH TUBE CLEANERS.—Catalog W-1 of the Lagonda Manufacturing Company, Springfield, Ohio, is devoted to its line of arch tube cleaners. Several types of cutting heads are shown,

and there are listed a number of accessories, including repair parts for the cleaner. In addition to the pneumatic cleaners, water and steam-driven cleaners are shown.

FABRIKOID.—In a publication entitled "The Orange Book" the DuPont Fabrikoid Company, Wilmington, Del., presents a number of exhibits which are extracts from proceedings or articles dealing with upholstery, all of which are given to show the superiority of Fabrikoid over the poorer grades of split leather for use in furniture upholstery, automobiles, etc.

EXPANDED METAL LATH.—Kno-Burn expanded metal lath is the subject of a 52-page booklet, issued by the North Western Expanded Metal Company, Old Colony building, Chicago. The advantages claimed for this type of lath are shown in detail, stock sizes and weights are given, and a large number of illustrations are included giving details of application.

EXPANSION AND TOGGLE BOLTS.—The 1915 catalog, No. 40, that has been recently issued by the Steward & Romaine Manufacturing Company, Philadelphia, Pa., illustrates and explains the many types of expansion and toggle bolts manufactured by this company. It also shows some tools for use in drilling holes for bolts in brick, concrete, granite and hollow bricks, etc.

PORTABLE AIR COMPRESSORS.—Form No. 3,015, issued by the Ingersoll-Rand Co., 11 Broadway, New York, contains 32 pages, 6 in. by 9 in., and is a complete treatise on the subject of portable air compressing outfits. A list of bulletins is given describing in detail each particular line of portable compressors, as well as catalogs of the various pneumatic tools and equipment mentioned.

STORAGE BATTERY CARS.—Bulletins No. 30, 31, 32 and 34, issued by the Railway Storage Battery Car Company, New York, illustrate and describe a number of city and interurban cars equipped with storage batteries for supplying driving power. One of the bulletins gives some comparative costs between standard overhead construction and the equipment necessary when Edison batteries are used.

LOCOMOTIVE CRANES.—The Ohio Locomotive Crane Company, Bucyrus, Ohio, has issued a 56-page catalog in which the construction of its line of locomotive cranes is set forth in detail. The catalog contains a large number of illustrations of detail parts, as well as reproductions from a number of photographs, showing the cranes in service. Clearance diagrams of various types of cranes are also given.

WATER METERS.—The Harrison Safety Boiler Works, Philadelphia, Pa., has issued engineering leaflet No. 18, dealing with the Cochrane V-notch weir, used in the Cochrane metering heater. This pamphlet is a reprint of two papers on the V-notch weir, showing the refinements essential to accuracy in investigating problems in hydraulics and the constancy of the V-notch weir when used under those conditions.

PRESSED STEEL BUILDING CONSTRUCTION.—"Kahn Pressed Steel Building Construction," is the title of a booklet which has just been issued by the Trussed Concrete Steel Company, Youngstown, Ohio, describing the use of pressed steel construction for small buildings, and showing how such buildings can be erected by any ordinary mechanic with the use of a hammer as the only tool, and can then be covered with stucco.

SAFETY RULES.—The Whiting Foundry & Equipment Company, Harvey, Ill., has recently issued a poster containing safety rules for cranimen, crane operators, floormen and repairmen. The poster has the words "Safety First" printed in large red letters at the top and the rules are from a safety bulletin issued by the National Founders' Association. The poster is suitable for placing in shops for the guidance of workmen.

AUTOMATIC HIGHWAY CROSSING GATE.—The Cook; Railway Signal Company, Denver, Colo., has recently issued a booklet entitled "Safety First in Reality," describing in detail the construction and operation of the Cook automatic electric highway crossing gate. This gate operates from track circuits or track instruments like an automatic signal. When lowered by the coming of a train, the gate arm is suspended horizontally about 13 ft. above the track, and from it there hang crucible wire tell-tales usually about 8 ft. long. At the same time a bell is rung and two lights are shown, one, a red light, appearing as a warning to the vehicle on the highway and the other, a white light, lighting up the tell-tales and the crossing.

Railway Construction

CHICAGO, MILWAUKEE & ST. PAUL.—The Seattle, Port Angeles & Western has been opened for traffic from Port Angeles, Wash., west 26 miles. The line is being extended from Port Angeles east to Puget Sound, about 45 miles, and it is expected that this section will be completed in about six months.

CUMBERLAND & MANCHESTER.—Incorporated in Kentucky with \$50,000 capital and headquarters at Manchester. The plans call for building from Barbourville, Ky., north to Manchester in Clay county 24 miles. C. F. Heidrick, president; F. N. Heidrick, vice-president, both of Brooksville, Pa., and G. M. Richards, Jr., secretary and treasurer, Clarion, Pa. C. B. Lytle, is a director, Manchester, Ky. (See Cumberland Northern, May 7, page 993.)

CUMBERLAND NORTHERN.—See Cumberland & Manchester.

EDMONTON, DUNVEGAN & BRITISH COLUMBIA.—The Canadian parliament has granted an extension of time to this company in which to build the extension from Spirit river, Alta., to a junction with the Pacific Great Eastern at the Alberta-British Columbia boundary, and has also authorized the building of an additional line through Grand Prairie district to Jasper House, Alta. (April 23, p. 913.)

JACKSONVILLE & FLORIDA (Electric).—Organized in Florida with \$500,000 capital to build the electric line from Jacksonville, Fla., southwest to Middleburg, about 25 miles, thence west to Providence in Bradford county, in all about 60 miles. Financial arrangements have been made to build the first section of ten miles, and construction work is now under way. A. W. MacKinlay, president; R. F. Ensey, vice-president. (See Jacksonville-Middleburg, March 5, p. 427.)

KANAWHA, GLEN JEAN & EASTERN.—Preliminary arrangements are being made to start work soon on a line to the Laura, Red Star and Harvey coal mines in West Virginia. The company now operates an 8-mile line from Glen Jean, in Fayette county, W. Va., south to Tamroy, also a branch from Glen Jean, west to Pax, 9.5 miles, and has plans already made to build an extension from Tamroy, south to Skelton. (March 14, p. 1033.)

KANSAS CITY CONNECTING RAILROAD.—The Missouri Public Service Commission has authorized this company to reconstruct seven miles of tracks and terminals of the stock yards at Kansas City, including the construction of a subway under the Union Pacific tracks near the Kaw river. Four and one-half miles of the tracks will be in Missouri and two and one-half in Kansas.

MIDLAND RAILWAY.—A charter has been granted this company in Georgia, it is said, with a capital of \$1,000,000, and construction work is now under way. The plans call for building from Savannah, Ga., northwest, via Pineora, Statesboro, Swainsboro, Wrightsville and Sandersville, to Milledgeville, about 150 miles. A number of branch lines are also to be built. H. O. Buman, Savannah, is an incorporator, and G. M. Brinson, Springfield, is said to be interested (May 7, p. 993).

NAAS & SKEENA RIVER RAILWAY.—See Pacific, Peace River & Athabaska.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, will open bids on June 15 for the construction of Section No. 1, between Eastern Parkway and Church avenue, of Route No. 29, a part of the Nostrand avenue subway in the borough of Brooklyn. This line is a branch of the Eastern Parkway subway.

The commission has awarded the contract for the construction of Section No. 2 of Route No. 49 to the Oscar Daniels Company, the lowest bidder, who offered to do the work for \$863,775. (May 28, p. 1139.)

Bids for the completion of construction and station finish in the Fourth avenue subway, Brooklyn, from Flatbush avenue extension to forty-third street, have been received by the commission (May 21, p. 1099).

NORWICH, COLCHESTER & HARTFORD TRACTION.—This company's charter has been amended and the time extended for two years in which to complete an electric line between Norwich, Conn., and Hartford. About seven miles of the line is finished, from Silver Lane to Glastonbury, and there remains about 25 miles yet to be built. New York financiers have become interested in the proposition. W. S. Garde, Hartford; E. Robinson, W. A. Strickland, Glastonbury; S. R. Ketcham, New York; Dr. C. E. Stark, Mayor T. C. Murphy, F. Kromer and C. S. Holbrook, Norwich, are directors. (January 29, page 211.)

OKLAHOMA & TEXAS SOUTHERN.—According to press reports, grading work has been finished by this company on a line from Montague, Tex., southwest to Bowie. It is understood that an extension is to be built from Bowie southeast to Denton, about 40 miles. W. A. Squires, Henrietta, Tex., is said to be interested.

PACIFIC, PEACE RIVER & ATHABASKA.—The Canadian parliament has authorized a change in the location of the Pacific coast terminus, from the mouth of the Naas river to the Kitimat arm, and has also granted an extension of time in which to build the line. The plans call for building from the Pacific coast east to Prince Albert, Sask. The company has also secured the charter of the Naas & Skeena River Railway, which has been granted an extension of time in which to build from Nasoga gulf to the Skeena river. The tramway which this company plans to build at Vermillion Falls on the Peace river under the name of the Peace River Tramway & Navigation Company will be standard gage, and is to be five miles long. It will be operated by steam at first, but later by electricity. The company also plans to build another tramway about 15 miles long between Smith's Landing and Fort Smith.

PEACE RIVER TRAMWAY & NAVIGATION COMPANY.—See Pacific, Peace River & Athabaska.

ST. JOHN & QUEBEC.—The New Brunswick government has passed an act providing for the appointment of a commission to complete the St. John Valley Railway in case the contractors fail to meet their obligations within a specified time. The central section from Centreville to Gaagetown has been completed, and the Intercolonial is now operating the section from Fredericton to Centreville, 88 miles. The line is being built from Grand Falls, N. B., southeast following the St. John river to St. John, about 210 miles. (March 19, p. 649.)

SEATTLE, PORT ANGELES & WESTERN.—See Chicago, Milwaukee & St. Paul.

RAILWAY STRUCTURES

KANSAS CITY, Mo.—The Alton Grain Elevator Company, a subsidiary of the Chicago & Alton, is constructing a reinforced concrete elevator, consisting of a working house and 8 bins. Its capacity will be 275,000 bu., but it is so designed that it can be increased to 1,000,000 bu. It will be operated by electricity. The elevator was designed by E. Lee Heidenreich of Kansas City. The contract has been awarded to Wells Brothers, 53 West Jackson boulevard, Chicago. The construction is in active progress under the supervision of H. T. Douglas, chief engineer of the Chicago & Alton, and it is expected the elevator will be completed by September 15.

OTTAWA, ONT.—Bids are wanted until June 8, by J. W. Pugsey, secretary, Department of Railways and Canals, Ottawa, for a number of small bridges on the main line of the Intercolonial Railway.

SAYRE, PA.—The Lehigh Valley will at once build a fireproof roundhouse, with stalls for 50 locomotives at Sayre. Contract for the building, which is to be of hollow tile and cement construction, has been given to Westinghouse, Church, Kerr & Company, New York. The total cost of the improvements will be \$400,000, including a new turntable and accessories.

SOMERSET, PA.—The Baltimore & Ohio has completed plans for a new passenger station, to be built at Somerset, to replace the present structure. The new station will be 30 ft. by 75 ft. of brick construction with tile roof. The work is to be started at once and will be carried out by the company's forces. The present station will be moved across the tracks and fitted up as a freight station, having separate team and house tracks.

Railway Financial News

MISSOURI PACIFIC.—On Wednesday night the directors announced that they had received \$21,349,000 of the \$25,000,000 notes which were due on June 1, and of which they asked the extension to June 1, 1916. The extension plan has been declared operative.

E. E. Ravellain, holding \$72,000 notes, presented the notes for payment on Wednesday, and upon the refusal of the company to make payment he brought suit and obtained an attachment on the property of the company in New York state, which is said to consist of nothing but the office furniture. The company gave out a statement saying that Mr. Ravellain did not appear on the company's books as the owner of any of the notes.

NATIONAL RAILWAYS OF MEXICO.—A cable despatch from London says that the \$27,640,000 2-year 6 per cent notes of the National Railways of Mexico, due June 1, were not paid, but it is not announced as to what provisions have been made for the extension of these notes or for legal action under the terms of the indenture securing them.

NEW YORK, NEW HAVEN & HARTFORD.—Governor Walsh of Massachusetts has vetoed the validation bill which provided for the reorganization of the finances of the New York, New Haven & Hartford and the Boston & Maine, both of which bills had been passed by both houses of the Massachusetts legislature. In sending his veto to the legislature Governor Walsh said in part:

"This question is now of national importance. The issue is whether the public shall be called on to pay only a return on honest investment, or shall be charged with all sorts of extortion based on all kinds of artificial capitalization.

"Common honesty as well as the common welfare requires that the issue shall be fought out and decided in favor of what is now the sound and established policy of this commonwealth, even if the controversy should require an amendment to the national constitution."

ST. LOUIS & SAN FRANCISCO.—Bankers connected with the reorganization committees have been quoted as saying that it is hoped that the receivership may be ended by July 1, and that a tentative plan has been accepted by the committees representing the refunding 4 per cent bonds and the general lien 5 per cent bonds, but that the question of the amount of assessment has not as yet been decided on.

WABASH.—National banks of New York City holding, it is said, about \$40,600,000 first refunding and extension 4 per cent bonds of the Wabash, recently asked the Controller of the Currency whether they could assent to the plan of reorganization by which the holders of these bonds underwrite the issue of new preferred stock in exchange for an assessment. (May 7, pages 957 and 978.)

MEN OF ENGLISH RAILWAY WITH THE COLORS.—In the latest Roll of Honor poster issued by the London & North Western Railway, it is stated that 13,659 members, or 15.8 per cent of the whole of the company's staff, have joined the colors.

ELECTRIFICATION IN SILESIA.—Just before the war trial runs were about to be made on the Silesian lines of the Prussian State Railways, between Lauban and Königszell. The work has now been stopped, and it is extremely unlikely that anything further will be done until after the war. Altogether, 310 miles of track are being electrified, the line being 170 miles long. The lines are in a mountainous district, where normally there is a heavy coal and passenger traffic. It is intended to run 500-ton passenger trains and 1,200-ton freight trains. In common with all other recent German electrification schemes, single-phase current is to be used, the trolley voltage being 15,000 at 16⅓ cycles. When the war began there were under construction 14 locomotives for high-speed passenger service, 30 for freight and seven for light passenger service. The average speed of the freight engines is to be 12.4 miles an hour, and the maximum speed 27.9 miles an hour.